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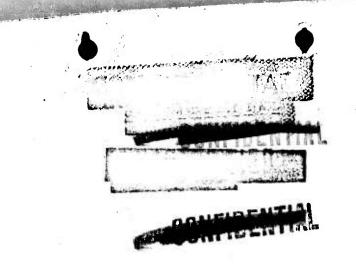
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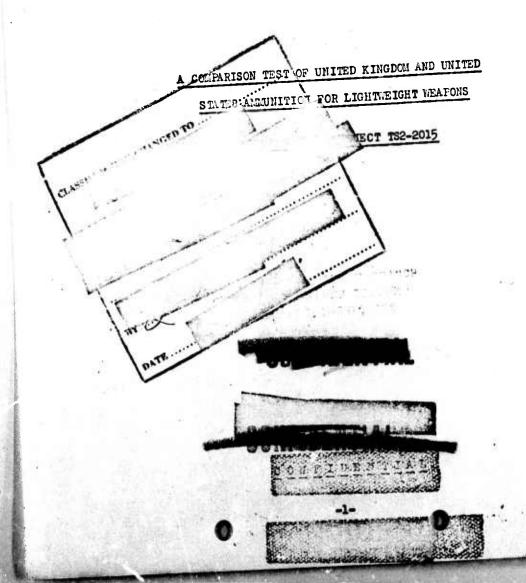
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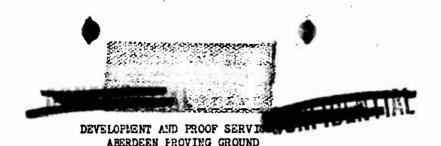
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AUTHORITY: ORDIS

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A COMPARISON TEST OF UNITED KINGDOM AND UNITED

MARYLAND

STATES APAUNITION FOR LIGHTWEIGHT WEAPONS

NINTH REPORT OF PROJECT TS2-2015

DATES OF TEST: 14 February 1950 to 22 May 1950

OBJECT

To evaluate and compare the performance of U. S. Caliber .30, T65, Ball, AP, API, Tracer and Spotting Ammunition with that of U. K. Caliber .28C, Ball, AP, API, Tracer and Observing Ammunition.

SUMMARY

The subject ammunition was compared by conducting the test in accordance with the plan as agreed to by representatives of the United States and United Kingdom. Some phases of this test plan were deleted by the Working Committee to avoid duplication of phases covered by the "User" or the "Rifle" tests of this project.

CONCLUSIONS

It is concluded that the caliber .30, T65 ammunition is superior to the caliber .280 ammunition with regards to accuracy, trajectory, and penetration. The caliber .280 ammunition is superior with regards to the ignition characteristics of the API round, and functioning of the tracer and observing round. The caliber .280 ammunition also has superior ballistic coefficients compared with those of the caliber .30, T65 ammunition.

RECOMMENDATIONS

It is recommended that in any future development of weapons and ammunition by the U. K. and the U. S., every effort be made to perfect the ammunition prior to designing the weapon.

Before weapons of any type are considered for joint comparison trials by U. K. and U. S., they should be chambered for a common round of amnunition, which is acceptable to both countries.



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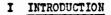
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AGUFIJENTIAL



A. DISCUSSION

In World War II the United State states with many allies most no table of which was Great Britain. Throughout this conflict there were few common arms between us. Had British and United States arms been "standardized", much confusion, complication and cost could have been eliminated.

With the ultimate object being standardization, both the United States and Great Britain have been developing versatile lightweight weapons. It is hoped that a satisfactory weapon can be developed, and "standardized" which will replace certain present standard weapons. Development has been guided by requirements set up by the using arms of the United States and Great Britain.

A weapon proposed by the United States is the lightweight rifle, T25 firing a caliber .30, T65 cartridge, while those proposed by Great Britain are the EM-2 or FN auto-rifles, both firing a caliber .280 cartridge.

This test was set up by representatives of the United States and Great Britain to obtain data so that an evaluation could be made of the two types of ammunition used in the above weapons.

B. REFERENCES

- 1. Authority for Test
- a. Letter, file APG (C)474/21 dated 3 February 1950, Subject: Comparative Tests of Light Rifles.
 - 2. Technical References
- a. Firing Record S-14377, Development and Proof Services, Aberdeen Proving Ground, Maryland.
- b. First Report of TS2-2015 dated 10 January 1949, A Test of Cartridge, Ball, Caliber .30, T65El and Rifle Lightweight Caliber .30, T25.
- c. Tenth Report of Project No. TS2-2015. A Comparison Test of United Kingdom and United States Lightweight Rifles.

II DESCRIPTION OF MATERIAL

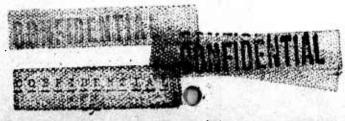
- A. The ammunition undergoing test had the following characteristics:
 - 1. Cartridge, caliber .30, ball, TlOh, Lot No. FAX30-1358 Case, T65E2, 1949 brass, 180.35 grains Bullet, ball, TlOh, 136.83 grains Charge, ball, Table 182414 1657 grains



O. FAX 30-1357

2. Cartridge, caliber .30, AP, T93, Lot No. TAX Case, T65E2, 1949 brass, 180.51 grains Bullet, AP, T93, 136.08 grains Charge, ball powder, Lot W2615, 46.55 grains

- 3. Cartridge, caliber .30, API, T101, Lot No. 14136 Case, T65E2, 1948 brass, 180.11 grains Bullet, API, T101, 137.52 grains Charge, ball powder, Lot W2615, 45.79 grains
- 4. Cartridge, caliber .30, tracer, T101, Lot No. FAX30-1359 Case, T65E2, 1949 brass, 179.95 grains Bullet, tracer, T102, 134.12 grains Charge, IMR 3031, 39.65 grains
- 5. Cartridge, caliber .30, spotting, T102, Lot No. 2
 Case, 180.02 grains
 Bullet, 119.66 grains
 Charge, 43.71 grains
- 6. Cartridge, caliber .30, grenade, Tl16, Lot No. FAX30-1367
 Case, FA-T-1-E-1
 Charge: Black powder Al, 1 grain
 IMR 4895 40 grains
- 7. Cartridge, SA, caliber .280, ball, Lot 19A Case, 150.72 grains
 Bullet, ball, 139.63 grains
 Charge, NRN 11, Lot D 16520, 30.57 grains
- 8. Cartridge, SA, caliber .280, AP, Lot 24A
 Case, 150.59 grains
 Bullet, AP, 128.45
 Charge, NRN 11, Lot D 16520, 29.55 grains
- 9. Cartridge, SA, caliber .280, API, Lot 23A Case, 150.84 grains
 Bullet, API, 130.24 grains
 Charge, NRN 11, Lot D 16520, 29.44 grains
- 10. Cartridge, SA, caliber .280, tracer, Lot 32A Case, 151.16 grains
 Bullet, 115.17 grains
 Charge, IMR, 25.51 grains



11. Cartridge, SA, caliber .280, OBS, Lot 17A Case, 150.73 grains
Bullet, 127.54 grains
Charge, NRN 11, Lot D 16520, 29.33 grain

12. Cartridge, SA, caliber .280, grenade, Lot No. 20E

Photographs of the above cartridge components are enclosed as Appendix B.

III DETAILS OF TEST

A. PROCEDURES

- 1. Mann barrel accuracy at 600 yard range.
 - a. Equipment using caliber .30, T65 ammunitions

Rifle, accuracy, caliber .30, T7692088
Rest, recoil, accuracy, caliber .30, 49-6-408
Frankford Arsenal machine rest

b. Equipment using caliber .280 ammunition:

Mann barrel, fitted to P-17 receiver (Enfield, caliber .30 action) Vee slide, No. 101, type 18826 (British manufacture)

The above equipment used in the U. K. for caliber .280 accuracy firing was adapted for use in this test by securing the vee slide to a 1-1/2 inch steel plate and in turn fastening this to a Frankford Arsenal machine rest with 4 - 3/8" machine bolts. Appendix C, Photograph A61272, shows the weapon used for firing the caliber .280 ammunition and the method of fastening to the FA rest. Appendix C, Photograph A61273, shows the caliber .30 accuracy rifle, recoil rest, and FA rest. Note that in the caliber .30, T65 equipment the weapon is securely clamped in a rest which recoils whereas the caliber .280 weapon recoils sliding in a vee which is stationary. Recoil of the caliber .280 weapon is restrained by a spring-loaded vee-shaped fixture at the rear of the barrel.

c. Five ten-shot accuracy targets of each type of ammunition were fired and measured. Two series of five ten-shot diagrams were fired with tall and AP ammunition of each caliber. Two weapons, of each caliber, were used in firing the ball and AP ammunition as a check on performance of equipment. All firing was conducted in accordance with ORD-M608-PM, Volume III, 7-14. All firing was conducted when wind velocity was 10 mph or less; however, to eliminate any variable in wind velocity or direction on the different calibers undergoing test, the following procedure was adopted.



Two weapons, one of each caliber, were fired simultaneously down the same range. Therefore, for each accuracy target of one caliber, an accuracy target of the other caliber is recorded that was fired under identical conditions of wind velocity and direction.

In addition to the ammunition undergoing test, and in both caliber .30. T65 and .280 using lead-core ball ammunition.

2. Velocity Firing

- a. Equipment using caliber .30, T65 ammunition: Universal receiver, calibor .30, M2; Velocity barrel, light rifle, chambered in accordance with SK-FSA5212; Rest, recoil, for Universal receiver; Frankford Arsenal machine rest.
 - b. Equipment using caliber .280 ammunition:

Ordnance Factory Base Pressure Housing. (British manufacture)
Velocity barrel fitted to above housing, No. 449/5.

The above housing was securely bolted to a one-inch steel plate which in turn was bolted to a Frankford Arsenal machine rest.

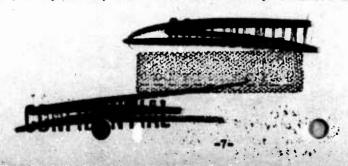
c. All velocities were recorded on a counter chronograph initiated by lumiline screens placed 53 and 103 feet from the gun muzzle.

All firing was conducted in accordance with ORD-M608-PM, Volume III, 7-13.

- d. All velocity averages were obtained from 20-round strings.
- e. Prior to firing, all ammunition was conditioned for at least 2 hours in a controlled constant temperature. Ammunition was fired after conditioning at +70°F, +165°F and -65°F.
- f. Appendix C, Photographs A61274 and A61275 show the caliber .30 and caliber .280 velocity and pressure equipment utilized in this test. The only difference in velocity and pressure equipment is in the barrel, therefore, the photographs enclosed are titled, pressure barrels.

3. Pressure Firing

a. Equipment using caliber .30, T65 ammunition: Universal receiver, caliber .30, 12; Pressure barrel, light rifle, No. G30 chambered in accordance with SK-FSA-5212; Rest, recoil, for Universal receiver; Frankford Arsenal machine rest.



b. Equipment using caliber .280 ammunition

Ordnance factory base pressure housing Pressure barrel fitted to above housing, No. 49/6

The above housing was used in the velocity of the one method of mounting is described under III, A, 2b. The caliber to barrels No. 449/5 and No. 449/6 are identical and can be used interchangeably. However, for this test No. 449/6 was designated as a pressure barrel and No. 449/5 as a velocity barrel.

The base pressure gage used in this test consists of a pressure housing, breechblock, firing mechanism and adapters, so pressure recordings can be taken from any type of proof barrel. The breechblock is designed so that a well in the forward part accommodates a copper and a steel pad; the thickness of the steel pad varies with the tonnage of the copper used. The resultant combination permits a definite head space to be obtained when the mouth of the well is in direct contact with the breech end of the barrel. The copper used has a circular hole through the center; the firing pin passes through this hole and through a corresponding hole in the steel pad.

Immediately prior to loading, the cartridge case is dipped to a depth a little below the shoulder in oil. When the round is fired, the cartridge case sets back and acts as a piston against the steel pad which in turn compresses the copper. The amount of compression of the copper (or decrement) is measured and this is converted to pressure by reference to the correct tarage table.

The coppers used with this equipment vary in diameter according to the caliber under test and in length according to the amount of the precompression applied, each type of precompressed copper is further subdivided into five grades to compensate for small variations in hardness in the copper.

Care must, therefore, be taken to select for a particular set of pressure measurements a copper, the pressure decrement of which will lie within the range of .010" to .030". Consequently it was not possible in all cases to utilize the same precompressed tonnage copper either for the various types of rounds at one temperature or for one type of round at various temperatures. Since coppers of different precompressions gave slightly different recorded pressures for the same actual pressures, directly comparative pressure results are not normally obtained.

Appendix C, Photograph A61278 shows a disassembly view of the Ordnance Factory Pressure Housing. The position of a round of ammunition and a base copper, relative to the firing mechanism are also shown.

c. Averages were obtained from twenty-round strings.

d. Prior to firing all ammunition was conditioned for at least two hours in a controlled constant temperature. Ammunition was fired after conditionals at +70°F, +165°F and -65°F.



4. Flash Test Firing

- a. Flash characteristics of both calibers of ammunition rom weapons having the same barrel length and by firing ball ammunition from weapons designed for the respective ammunition.
- b. Firing was conducted in a darkened closed range to better observe flash and make possible the use of a camera to obtain a permanent record. Flash from all firing was photographed by two f2.5, 4 x 5 inch Speed Graphic cameras using Super XX film.
 - c. Firing was divided into two phases as follows:
- (1) A twenty-round burst of each type ammunition in both calibers was fired from M1919Al; machine guns modified for the caliber .30, T65 and caliber .280 respectively.
- (2) Twenty rounds of ball ammunition were fired single shot from the caliber .30 rifle, NI; caliber .30 lightweight rifle T25; caliber .280 auto-rifle EM-2; and the caliber .280 auto-rifle, FN. All rifles were fired with and without flash hider except the caliber .280, EM-2 which does not require a flash hider. In the above firing, photographs and visual observations were taken of the cumulative flash of all rounds fired.
 - d. The two cameras were placed and designated as follows:
 - (1) Camera A; 4.5' left of gun mussle
 - (2) Camera B; 2' left and 3.5' to rear of gun muzzle

5. Smoke Test Firing

Smoke characteristics of the ammunition undergoing test were compared by visually observing the relative obscuration of a 20-foot square target placed 150 feet from the gun mussle. Observation was made during burst fire from a gunner's 'position directly behind the gun. Modified M1919All machine guns were used in this phase. To record the resultant smoke and obscuration, a 16-mm motion picture camera was operated 9 feet to the rear and 9" above the gun mussle. The film is on file at this station and is available for further study. Since smoke is a characteristic of the propellant and is little affected by the bullet, only ball and tracer ammunition of each caliber were fired.

6. Tracer Test Firing

a. Comparison of tracer characteristics between the caliber .30, T65, and caliber .280 ammunition undergoing test was conducted by firing from modified M1919A4 machine guns.

lowing characteristics were observed:

(1) Length of trace: This was taken at night by firing over water in which range stakes were placed every fifty! yards. Observation was made by qualified observers located in a tower looking down on the bullet path and range stakes. Length of trace can be measured to the closest 25 yards by this method.

- (2) Length of igniter: This was measured by observing the point at which the tracer composition reached its normal brilliance. Observation was made at night with reference to lights placed 25, 50, 75, and 100 yards from the gun muzzle.
- (3) Brilliance of igniter and trace-were observed in conjunction with the above firing.
 - (4) Percent ignition was calculated from the results of above firing.
- (5) Daylight visibility of trace was observed from the gun. This was observed during the firing conducted to obtain smoke characteristics.
- 7. The caliber .30 grenade ammunition was fired in the lightweight rifle, T25, and the caliber .280 grenade ammunition in both the auto-rifle EK-2 and auto-rifle FN. The rifles were fired at a thirty-degree angle to the horizontal with the butt placed firmly on the ground. Since accuracy of the grenade depends more on the grenade than on the launching ammunition, accuracy was not measured. During this phase, functioning of the launching ammunition and range of the grenades fired were observed. Grenade, AT, practice, M11A2, were utilized for functioning and determining range.
- 8. Due to the small quantity of ammunition available, very little could be done to determine erosion characteristics. Erosion data were obtained in conjunction with the lightweight rifle test of this same project by measuring instrumental velocity at 78 feet in rifles used in the rifle test. Velocity was measured from 9 rifles at the beginning, during, and at the conclusion of the rifle test. The amount of velocity drop is one measure of barrel erosion.

Erosion characteristics of the ammunition in machine gun barrels were not obtained due to lack of ammunition. A limited number of burnt velocities from M1919A4 machine guns were obtained during the function firing of API and observing ammunition. These velocities were recorded on a counter chronograph initiated by lumiline screens placed 53 and 103 feet from the gun mussle.

The velocity of ball amminition when fired from those barrels used in the penetration test were also recorded using the above equipment. These velocities were recorded to insure that the velocity level of the penetration barrels had not dropped throughout the penetration test.

designation Firing

a. Tank ignition characteristics of the API ammunition were obtained by firing the following program:

- (1) At 100, 300, and 500 yards range.
- (a) Above and below fuel level with fuel container exposed, $1/2^n$, 4^n , 8^n , and 12^n behind a 10-gauge mild steel plate.
- b. Seventy-two octane, automotive grade gasoline was used throughout the test.
 - c. Fuel was contained in standard 5-gallon issue type safety cans.
- d. To maintain uniformity in conditions throughout the firing the following procedure was followed.
- (1) All recorded hits on the target were true, i.e., hits near the edge of the can or on seams were disregarded and additional firing was conducted.
- (2) Firing of the two calibers of ammunition was conducted with weather conditions as nearly alike as possible.
- (3) During firing above the fuel level, an attempt was made to maintain the same vapor concentration in the can for each can fired.
- (4) All hits on the plate in front of the fuel can were true hits. All doubles etc were disregarded and refired.
 - (5) A new can was utilized for each shot recorded.
- e. All firing was conducted from weapons utilized in the accuracy phase. (Mann barrels)
- f. A limited investigation of the functioning characteristics of the API ammunition firing from a machine gun was conducted. This was performed by firing API linked 1 to 4 with ball or AP ammunition in cold and in hot barrels. Occurrence of muzzle bursts were of primary interest.
- g. It was agreed by the Working Committee that a sufficient comparison of ignition characteristics could be obtained from the above program and firing with fuel at -65°F and +125°F as requested in the directive was deleted.





Penetration characteristics of the Ball, AP and API ammunition going test were obtained by firing the following program:

- (1) The following targets were utilized:
- (a) One-inch pine boards placed one inch apart. Photograph No. A61221 (Appendix D).
 - (b) Ten-gauge mild steel plates placed four inches apart.
 - (c) Helmet, Ml.
 - (d) Vest, armor, M12.
 - (e) Masonry-bonded, brick wall, 8-1/2 inches thick.
- (f) Hard homogeneous armor 1-1/2 inches thick at angles of 0°, 20°, 30° and 40° (Brinell 286).
- (2) The above targets were to be fired at from the following ranges: 25, 100, 300, 600, 800, 1000, 1200, 1600 and 2000 yards. Firing on a particular target was discontinued at the range at which penetration was not achieved.
- (3) All firing at ranges up to 600 yards was conducted with a rifle, and at 800 yards and over a modified M1919A4 machine gun was used.

The caliber .30 ammunition was fired from lightweight rifle, T25, No. 10. The caliber .280 ammunition was fired from auto-rifle EM-2, No. 3.

- (4) Instrumental velocity at 78 feet was recorded for the above weapons prior to and at the completion of the penetration firing.
- (5) Instrumental velocity at 78 feet was recorded for the caliber .280 and caliber .30 machine gua barrels at the conclusion of the penetration firing.
- (6) It was agreed by the Working Committee that average concrete, common earth, and sand in bags as listed in Test 1, Phase II of the Test Plan be deleted as targets. It was further agreed that depth of penetration in 1-1/2 inch hard homogeneous armor at various angles of obliquity would be acceptable. This armor was substituted due to the supply shortage of various thicknesses of adequate armor plate.
- 11. Time-of-Flight data were obtained for Ball, AP, API, Tracer and Observing ammunition of each caliber by conducting the following program:



a. Firing was conducted from those kann barrels, (450/3 and 1528613,) utilized in the 600-yard accuracy firing. These barrels were supported in a steady was slide and allowed to recoil in this slide.

Since two different calibers were fired, it was not practicable remate rounds; however, firing was conducted in such a way to keep all weather variables for each type round as near as possible the same.

- c. Velocity was recorded at 78 feet on a counter chronograph initiated by lumiline screens placed 28 and 128 feet from the gun muzzle.
- d. Time of flight of the projectile from the first lumiline screen at 25 feet to a wire mesh target placed down range was measured on a second counter chronograph. Twenty rounds of each ammunition type were measured for time of flight to 600 and to 1000 yards.
 - e. Other data taken consisted of the following:
 - (1) Azimuth of line of fire.
 - (2) Time each round was fire ...
- (3) Velocity and direction of wind, at time of firing each round, were recorded at firing site.
- (4) Density of air at time of firing determined from temperature measured at the firing site; and pressure and humidity measured by the Meteorological Section of this station.
- f. Prior to firing all rounds were base tapped to obtain more uniform results.
- 12. Maximum range data for caliber .30 and caliber .280 ball ammunition were obtained by conducting the following program:
- a. All firing was conducted from those weapons, (450/3 and 1528613), used in the 600 yard accuracy firing. The weapons were supported in a caliber .30 accuracy recoil rest mounted on a Frankford Arsenal machine rest. The caliber .280 barrel, (450/3), was modified to fit the above rest to facilitate firing.
- b. Elevation of fire was set at 28° by use of a clinometer, large, M1917. This angle was measured on the vee slide and correlated with the axis of bore which was the true elevation.
- c. The gun was located so that the bullets would fall on a previously measured water impact area. Range of each round was determined by observers placed in a dugout at the impact area.

d. Time of flight was taken by two observers at the impact area timing the gun report and water impact.

sero was conducted when surface and aloft wind velocities were

- f. Elevation of the gum muzzle above mean low tide was measured with reference to Bench Marks at the firing points.
- g. Weather data necessary in this firing were furnished by the Meteorological Section.
 - 13. Observing Cartridge Functioning
- a. A comparison of the functioning characteristics of the caliber .30 and caliber .280 ammunition was made by firing at the following targets from 1000 yard range:
 - (1) Hard packed cinder road.
 - (2) Sandy earth.
 - (3) Scrub brush
 - (4) Grassy field
 - (5) Brick wall, 8-1/2" thick.
- b. The 7.92 mm German observing round was used as a control in this firing phase.
- c. The above program was set up as that closest to duplicating the tactical use of observing ammunition. The complete program as requested in the test directive was not fired in order to conserve ammunition necessary for the user tests and to avoid duplication with the user tests.

II. Test number two as listed in Phase II of the Test Plan requesting a determination of the shock effect of the U. S. caliber .30 and U. K. caliber .280 ammunition was not conducted at this station. At the present time the above phase is being conducted by the Wound Ballistic Section of the Army Chemical Center. A separate report on shock effect will be prepared by that organization.

15. It was agreed by the Working Committee that tests seven, eight and nine as requested in Phase II of the Test Plan could be deleted. In accordance with the above, these tests were not conducted.



I munition of both calibers were fired from two weapons to obtain a better average.

The following abbreviations are utilized in the summary. All measurements are in inches.

MR - Mean Radius

B. RESULTS

MVD - Mean Vertical Dispersion

MHD - Mean Horizontal Dispersion

EVD - Extreme Vertical Dispersion

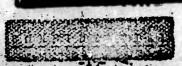
EHD - Extreme Horizontal Dispersion

ES - Extreme Spread

Complete accuracy data are enclosed as Appendix E.

Summary of Mann Barrel Accuracy at 600 Yards

WEAPON	1/R	MAD	THD	EVD	EHD	ES
1	AMMUNITION: Ca	rtridge, Ba	ll, Caliber .	30, T104, Lot	No. FAX30-13	58
1528385	5.43	3.09	2.97	15.52	16.58	19.87
1528613	5.38	3.45	3.36	13.63	13.77	17.97
Average	5.40	3.27	3.17	14.57	15.18	18.92
	AMMUNITI	ON: Cartri	dge, Ball, Ca	liber .280, L	ot 19A	
450/2	11.24	7.91	5.82	33.29	27.13	37.05
450/3	8.28	5.47	5.00	20.94	22.38	27.85
43-75						
Average	9.76	6.69	5.41	27.12	24.76	32.45
	ALMUNITION:	Cartridge,	AP, Caliber .	30, T 93, Lot	No. FAX30-135	7
1528 385	4.56	2.96	2.79	15.02	10.72	16.04
1528613	6.02	3.81	3.69	16.19	14.45	18.25
Average	5.29	3.39	3.24	15.61	12.59	17.15
						= • ••
	AMMUNITIO	N: Cartrid	ge, SA, AP, Co	liber .280,	Lot 24A	
450/2	9.88	6.31	6.18	24.11	26.20	31.46
450/3	12.75	9.18	6.66	35.81	31.56	43.59
Average	11.32	7.75	6.42	29.26	261.08	37.53
		0			. 4	
				COMPANY OF STREET	THE PERSON NAMED IN	



		13,900	A STATE OF THE PARTY OF THE PAR		Tallet I	2 E 2 UN
MEAPON	MR	MAD	MHD	EVD	EHD	FS
	ALMUNITION:	Cartridge,	API, Caliber .	30, T101, Lot	FAX30-1356	
1528385	6.18	3.88	4.51	14.80	17.19	19.84
Cillana	The state of the s	TION: Cartr	idge, SA, API,	Caliber .280	, Lot 23A	
450/2	7.22	4.79	3.96	23.64	15.55	24.40
	AMMUNITION:	Cartridge,	Tracer, Calibe	r .30, T102,	Lot FAX30-135	9
1528385	11.24	7.40	6.48	30.28	26.30	38.75
	AMMUNITIO	N: Cartridg	e, SA, Tracer,	Caliber .280	, lot 32A	
450/2	10.78	5.86	7.36	26.03	29.92	34.77
	AMMUNITION:	Cartridge,	Spotting, Cal	iber .30, Tlo	3, Lot No. 2	
1528385	10.29	6.01	13.88	33.38	24.91	34.58
	INUNCIA	TION: Cartr	idge, SA, OBS,	Caliber .280	, Lot 17A	
450/2	9.57	6.92	5.03	27.68	20.12	28.84

A tabulated summary of accuracy results obtained from firing lead core ball ammunition follows. Lot No. FAX30-1290 and Lot No. 21A were fired simultaneously as described in III, A, Method of Test. Lot No. 12A was fired at the request of the U. K. representative as a further control on the caliber .280 accuracy firing. The figures given are the averages obtained from 5 targets of each ammunition. Complete accuracy results are enclosed in Appendix E.

	150 GRAINS (LEAD CORE) CTG, BALL, CALIBER .30 LOT FAX30-1290	130 GRAINS (LEAD CORE) CTG, SA, BALL, CALIBER .280 LOT 12A	1LO GRAINS (LEAD CORE) CTG, SA, BALL, CALIBER .280 LOT 21A
MR	3.03	6.31	6.90
MVD	2.30	3.54 ·	4.51
MID	2.53	3.74	3.99
EVD	9.54	17.27	19.96
EHD	9.59	14.37	16.46
ES	12.04	21.02	21.59



2. A summary velocity results fired from velocity exclosives are the instrumental at 78 feet given in feet/per second. Complete velocity results are enclosed.

A STATE OF THE PARTY OF THE PAR		AMMUNITION TEMPERATURE	
	-65°F	+70°F	+165°F
ALMUNITION: Ca	rtridge, Ball, Caliber	.30, T104, Lot No. F	X30-1358
Average Velocity	2592	2771	2836
Maximum Velocity	2639	2818	2870
inimum Velocity	2534	2728	2792
xtreme Variation	105	90	78
tandard Deviation	36.1	21.8	17.
AMMUNITION	Cartridge, SA, Ball,	Caliber .280, Lot No.	. 19A
verage Velocity	2164	2273	2361
aximum Velocity	2218	بأبلاج	2399
inimum Velocity	2103	2224	2313
xtreme Variation	115	120	86
tandard Deviation	26.7	28.6	26.
ALMUNITIO	ON: Cartridge, AP, Cal	iber .30, 193, Lot FAJ	30-1357
verage Velocity	2606	2822	2835
aximum Velocity	2658	2862	2867
inimum Velocity	2505	2770	2807
xtreme Variation	153	92	60
tandard Deviation	37.2	22.3	16.0
AMMUNITIO	N: Cartridge, SA, AP,	Caliber .280, Lot No.	24A
verage Velocity	2067	2202	2302
aximum Velocity	2101	2236	2347
inimum Velocity	2016	2150	2283
xtreme Variation	85 ·	86	64
tandard Deviation	21	24.6	17.
AMMUNITION:	Cartridge, API, Calib	er .30, T101, Lot FAX3	0-1356
	10884EW	2730	2847
	2598	6/77	
verage Velocity	2598 2660	2739 2784	
verage Velocity	2598 2660 2554		2871
verage Velocity aximum Velocity inimum Velocity xtreme Variation	2598 2660 2554 106	2784	



AMMUNITION: Cartridge, API, Caliber .280, Lot No. 23A

Average Velocity Yaximum Velocity Minimum Velocity Extreme Variation Standard Deviation	2017	2196	2308.
	2097	2252	2387
	1970	2153	2241
	127	99	11,6
	33.9	30.1	46.3
Doggarder at Do			

ALEMUNITION: Cartridge, Tracer, Caliber .30, T102, Lot FAX30-1359

Average Velocity Maximum Velocity Minimum Velocity Extreme Variation Standard Deviation	2554	2629	2732
	2629	2678	2758 ·
	2511	2573	2703
	118	105	55
	31.8	30•3	15.3

AMMUNITION: Cartridge, Tracer, Caliber .280, Lot 32A

Average Velocity Examin Velocity Minimum Velocity Extreme Variation Standard Deviation	2114	2248	2370
	2218	2319	2399
	2070	2170	2326
	148	149	73
	36.7	30	15.4
Minimum Velocity Extreme Variation	148	149	17

AMMUNITION: Cartridge, Spotter, Caliber .30, T103, Lot No. 2

Average Velocity Maximum Velocity Minimum Velocity Extreme Variation Standard Deviation	2510 2568 2456 112 24•4	2726 2762 2671 91 24,1
---	-------------------------------------	------------------------------------

ALMOUNITION: Cartridge, OBS, Caliber .280, Lot No. 17A

2195 2253 2147 106 27.4	23.4 2287 2389 23.4 23.4 23.4
	2253 2147 106

Observing ammunition was not fired at +165°F due to the possible hazard involved.



Bur Buch .

3. A summary of pressure results forlows. Pressure is given in pounds per square inch. Velocity was taken 78 feet from the muzzle and is given in feet per second. Complete pressure results are enclosed as Appendix G.

	-	AMMUNITION TE	+165°F
	-65°F		
AMMUNITION: C	artridge, Ball, C	aliber .30, TlO4, L	ot No. FAX30-1358
	46515	52050	47715
lverage Pressure	50600	55100	51 500
Maximum Pressure	42400	50000	45100
Kinimum Pressure	<u>дедоо</u> 8200	5100	6400
Extreme Variation	2213	1380	1730
Standard Deviation		2753	2775
Lverage Velocity	2589	2790	2820
Maximum Velocity	2653	2737	2745
Minimum Velocity	2500	53	74
Extreme Variation	153	13.	
Standard Deviation	2.44	1).	
AMUNITION	1: Cartridge, SA	, Ball, Caliber .280), Lot 19A
	38750	43100	45000
Average Pressure	14100	45900	47300
Maximum Pressure	35800	41900	43900
Minimum Pressure	8300	7000	
Extreme Variation	2391	1100	
Standard Deviation	2156	2295	
Average Velocity		2328	
Maximum Velocity	2190	2266	11
Minimum Velocity	2053	62	
Extreme Variation	1.37		
Standard Deviation	28.4		
AMMUNITIO	N: Cartridge, AP	, Caliber .30, T93,	Lot FAX30-1357
Annua Dungana	48275	51270	4844,5
Average Pressure	52400	54900	
Maximum Pressure	43700	47000	46600
Minimum Pressure	8700	7900	5400
Extreme Variation	डागा ०	2542	1426
Standard Deviation	2628	2787	2814
Average Velocity	2677	2811	
Maximum Velocity	2568	2758	
Minimum Velocity	109	. 53	
Extreme Variation	30.3		Anticoenter 18.
Standard Deviation	"AUA"	The same of the sa	TOTAL STREET, THE PARTY OF



ALMUNITION TEMPERATURE +165°F +70°F +165°F

AMMUNITION: Cartridge, SA, AP, Caliber .280, Lot No. 2LA

Average Pressure Maximum Pressure Minimum Pressure Extreme Variation Standard Deviation Average Velocity Maximum Velocity Minimum Velocity	39200 41200 37850 3350 870 2238 2306 2180	40000 142500 38150 4350 886 2276 2330 2212
Minimum Velocity Extreme Variation Standard Deviation	126 36 . 9	25.5

Pressures of caliber .280, AP ammunition could not be recorded at -65°F with available equipment.

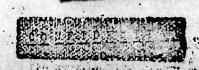
AMMUNITION: Cartridge, API, Caliber .30, T101, Lot FAX30-1356

Average Pressure Maximum Pressure Minimum Pressure Extreme Variation Standard Deviation Average Velocity Maximum Velocity Minimum Velocity Extreme Variation Standard Deviation	1,6205	50390	48495
	50100	52200	51800
	1,1500	46200	45000
	8600	6000	6800
	2191,	1043	1915
	2560	2695	2783
	2607	2743	2811
	2500	2671	2744
	107	72	67
	30.9	17.4	21.1

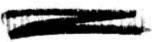
AMMUNITION: Cartridge, SA, API, Caliber .280, Lot No. 23A

Average Pressure Naximum Pressure Minimum Pressure Extreme Variation Standard Deviation Average Velocity Maximum Velocity Minimum Velocity Extreme Variation Standard Deviation	39500 142500 38100 14400 1249 2194 2252 2165 87 22.5	40900 43400 38150 5250 1385 2252 2343 2204 139

Pressure of caliber .280, API, ammunition could not be recorded at .65°P with available equipment.







	•	AMMUNITION TEMPERATURE	
-65 F		+70°F	+105°F

ALMINITION: Cartridge, Tracer, Caliber .30, T102, Lot FAX30-1359

Avérace Pressur	143845 51600	42885 46100	40575 42300
TIAT Tossure	37500	<i>3</i> 98 00	38600
E eme Variation	1/100	6300	4200
tandard Deviation	3150	1820	1195
Average Velocity	2476	2568	2668
Maximum Velocity	2585	2615	2704
Minimum Velocity	2393	2505	2 629
Extreme Variation	192	110	75
Standard Deviation	42.4	29.9	19.5

Caliber .280, tracer ammunition was not fired from a pressure barrel as pressures were too low to record with available equipment.

AMMUNITION: Cartridge, Spotter, Caliber .30, T103, Lot No. 2

Average Pressure	38860	42185
Maximum Pressure	41000	44,000
Minimum Pressure	31,000	38300
Extreme Variation	7000	5700
Standard Deviation	1609	1223
Average Velocity	250Ĺ	2708
Maximum Velocity	2571	2762
Minimum Velocity	عليابه	2674
Extreme Variation	125	88
Standard Deviation	27.3	22.5

AMMUNITION: Cartridge, SA, OBS, Caliber .280, Lot No. 17A

Average Pressure	36200	38500
Maximum Pressure	37200	39650
Minimum Pressure	35200	37400
Extreme Variation	2000	2250
Standard Deviation	669	729
Average Velocity	2261	2355
Maximum Velocity	23 25	2393
Minimum Velocity	2215	2303
Extreme Variation	110	90
Standard Deviation	26.1	90 27

Observing ammunition was not fired at +165°P due to possible as





4. The preceding velocity and pressure results on the caliber .280 ammunition were lower than that expected by the U.K. representatives. To confirm the preceding results and check on the equipment used, twenty-round strings of cartridge, SA, caliber .280, ball, lot 40A were fired in two different weapons recording velocity and the combined pressure/velocity. Lot 40A is used in the United Kingdom as a check lot and serves the same purpose as hand loaded reference rounds. Lot No. 40A was assessed to give an instrumental velocity at 90 feet of 2314 feet/sec and a base pressure of 46,800 pounds per square inch. This ammunition was conditioned at 80°F prior to firing. Assessment firing was conducted at Swynnerton, England, a proof estabilishment of the British Army.

A summary of velocity and combined pressure/velocity results for Lot 40A follows. Complete firing data are included as Appendix H.

Summary of Velocity Firing Conducted With Cartridge, SA, Caliber .280, Ball, Lot 40A

VFLOCITIES IN fps AT 78 FEFT						
WEAFON	AVERAGE	MAXIMOM	MINIMUM	EXTRELE VARIATION	STANDARD DEVIATION	DATE
149/5	2238	2306	2203	103	27 . 2	10 March 1950
149/5	2231	2264	2214	50	13.9	15 March 1950
1779/6	2266	2354	2188	166	40.4	10 March 1950
1779/6	2222	2246	2198	48	13.6	15 March 1950

Summary of Pressure Firing Conducted With Cartridge, SA, Caliber .280, Ball, Lot 40A

	WEAPON NO.	
	149/5	1419/6
Average Pressure	42750	42750
Maximum Pressure	43600	43450
Minimum Pressure	41850	41850
Extreme Variation	1750	1600
Standard Deviation	527	491
Average Velocity	2232	2236
Maximum Velocity	2273	2296
Minimum Velocity	2198	2194
Extreme Variation	75	102
Standard Deviation	16.8	31.3

5. To investigate the drop in pressure common to the caliber .30 ammunition at increased temperature additional firing was conducted at +70°F and +165°F from a different weapon. A caliber .30 pressure barrel fitted to a M1903 receiver was used. A summary of the results follow which verify the previous pressure firing. Pressures are given in pounds per square inch and velocity in feet per second measured 78 feet from the muzzle. Complete firing data are enclosed as Appendix I.

22-



Summary of Pressure Firing Conducted with Rifle, Caliber .30, Pressure, Barrel 17, Receiver No. 1195315.

470°F +165°	
ALMUNITION: Cartridge, Ball, Caliber .30, TlO4, Lot FAX30	1358
Average Pressure 46705 45045	
Maximum Pressure 49800 49000	
Minimum Pressure 43100 42200	
Extreme Variation 6700 6800	
Standard Deviation 1986 1905	
Average Velocity 2716 2733	
Maximum Velocity 2772 2793	
Minimum Velocity 2687 2637	
Extreme Variation 85 156	
Standard Deviation 23.4 30	9

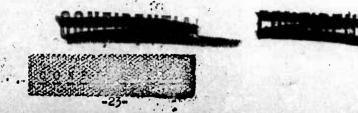
6. Complete data on firing performed to observe flash characteristics of ammunition are enclosed as Appendix J; all photographs taken during the above firing are enclosed as Appendix K.

In general, when fired from barrels of the same length (modified M1919All machine gun) the caliber .30 ammunition loaded with ball type powder gave considerably more flash than that from the caliber .280 ammunition. The tracer ammunition of each caliber, both loaded with an IMR powder, gave more comparable flashes, that from the caliber .30 being larger.

When fired from weapons with a barrel length designed for the two ammunitions undergoing test, the caliber .30 ammunition gives more flash. The above characteristics are given in more detail in the firing data. The accompanying photographs in Appendix K do not show all flash visible to the eye but merely serve as a means of relative comparison.

7. Complete data of firing performed to compare smoke characteristics are enclosed as Appendix L. A 16-mm motion picture film, APG 1135, taken during burst fire showing obscuration of a twenty-foot square target, 150 feet from the gum muzzle is on file at this station. (Film not available until August 1950.) This film is available for showing on request by any interested and authorized personnel.

In general, the smoke resulting from firing caliber .30, T65 ammunition was considerably denser and was produced in greater volume than that from caliber .280 ammunition. As in the case of visible flash, the tracer ammunition, both calibers of which were loaded with an IMR powder, gave comparable types of smoke.



M. A summary of results obtained during the tracer test follows:

Caliber .30, T65

Weapon: Gun, Machine, Caliber .30, M1919A4 (Modified), No. 839252, Barrel No. 4, Previous Rounds 100

Ammunition: Cartridge, Caliber .30, Tracer, T102, Lot No. FAX30-1359

Caliber .280

Weapon: Gun, Machine, Caliber .280, M1919A4 (Modified), No. OW 4966, Barrel No. 4, Previous Rounds 245

Ammunition: Cartridge, SA, Caliber .280, Tracer, Lot No. 32A

Summary of Tracer Test Results

	CALIBER .30 ALMUNITION	CALIBER .280 AMMUNITION
Average Length of Trace, Yards	879 900	1061 1075
Maximum Length of Trace, Yards Minimum Length of Trace, Yards	850	1000
Average Length of Igniter, Yards	50	64
Maximum Length of Igniter, Yards Minimum Length of Igniter, Yards	75 30	90 50
Number Rounds Fired	200	200
Number Failing to Trace % Trace	100	2 99
Color of Trace Brilliance of Trace Igniter	Dull Rod Brilliant Dim	Rese Red More Brilliant Invisible

9. Complete data taken during the firing of the grenade launching cartridges are enclosed as Appendix N. A summary of results follows:

RIFLE, LIGHTWEIGH	T, CALIBER .30, T25
NO. 14	NO. 15

Cartridge, Caliber .30, Grenade, Tl16, Lot FAX30-1367, Grenade, AT, Practice, M11A2

 Average Range, 10 Rounds, Feet
 617.3
 589.3

 Maximum Range, 10 Rounds, Feet
 649.0
 625.0

 Minimum Range, 10 Rounds, Feet
 590.0
 472.0

In Olivery





No.

LIGHTWEIGHT, CALIBER .30,

NO. 15

Fired With Addition of Cartridge, Grenade, Auxiliary, M7, Lot FA-S-31

Average Range, 10	Rounds,	Feet	955•3	910.8
Maximum Range, 10	Rounds,	Feet	1024.0	950.0
Minimum Range, 10			894.0	872.C

RIFLE, AUTO,	CALIBER .280, FM-2	RIFLE, AUTO	, CALIBER .280, FN
NO. 6	NO. 9	NO. 6	No. 7

14

Cartridge, Caliber .280, Grenade, Lot 20E . , Grenade, AT, Practice, M11A2

Average Range, Feet	731.0	Note 1	723.5	708.25
Maximum Range, Feet	800.0		766.5	7 l;2.0
Minimum Range, Feet	711.5	•	690.0	671.5

Note 1: On caliber .280 auto rifle EM-2, No. 6, four rounds out of ten failed to launch properly. On auto rifle EM-2, No. 8, seven rounds out of ten failed to launch properly. The grenade fin assembly tube split indicating that the combination of ammunition, grenade launcher and grenade as used with the EM-2 is neither safe nor satisfactory.

10. A tabulated summary of the ignition results of the caliber .30 and caliber .280, API ammunition follows. Complete firing results are enclosed as Appendix 0.

Summary of Ignitions Range 100 Yards

PLATE DISTANCE	STRIKE, REFERENCE TO FUEL LEVEL	CALIBER .30	, API, LOT	FAX30-1356 FAILED	CALIBER .2	80, LOT 23A FAILED
No Plate	Below Above	0		5	0	5
ь,	Below	0		5	1.	,
1/2 " 1/2 "	Abo ve	ì		4	2	3
7a	Below Above	2 4		-4 3	4 2	3 1
8" 8"	Below Above	0 2 .		5	2	3 4
12* 12*	Below	° Can	S. S. Salaman	5 5	5 Miles	0
	,	#SFEMADIS DOING	A COMPANIE		- metal	To Al





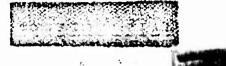
Summary of Ignition Firing Range 300 Yards

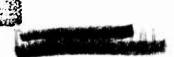
PLATE	STRIKE, REFFRENCE TO FUEL LEVEL	CALIBER .3	50, API, LOT FAX30-135		.280, LOT 23A FAILED
DISTANCE	TO POET DEADT	TONTIED			
No Plate	Below	0	5 4	0	5 5
No Plate	Above	1	4	0	5
1/2"	Below	2	3 3	3	2 5
1/2*	Above	2	3	0	5
4"	Below	2	3 4	3	2
ħ,	Above	1	4	1	4
8*	Below	0	5	2	3 5
8"	Above	2	3	0	5
12"	Below	0	5 5	3 1	2
12"	Above	0	5	1	4
	Sur		k Ignition Firing		
		Range	500 Yards		
No Plate	Below	1	4	0	5
No Plate	Above	1	4	2	3
1/2"	Below	0	5 5	3	. 2 5
1/2"	Above	0	5	0	5
4"	Below	2	3 4	3 0	2
Ţţ n	Above	1	4	0	- 5
8**	Below	1	4	5	. 0
8"	Above	. 0	5	0	5
12"	Below	1	4	4	1
12"	Above	0	5	Ó	5

11. Following are tabulated summaries of penetration results. These results were obtained from firing caliber .30, T65, and caliber .280 ammunition against various materials as listed. All firing at 600 yards or under was conducted with rifles while at 800 yards and over modified M1919A4 machine guns were utilized. The instrumental velocity at 78 feet of the weapons used is as follows:









Rifle, lightweight, caliber .30, T25, No. 10

Average velocity at beginning of test - 2737 fps Average velocity at end of test - 2754 fps

Gun, machine, caliber .30, M1919A4 (modified), barrel No. 3

Average velocity at end of test - 2687 fps

Caliber .280 weapons:

Rifle, auto, caliber .280, EM-2, No. 3

Average velocity at beginning of test - 2211 fps Average velocity at end of test - 2172 fps

Gun, machine, caliber .280, K1919A4 (modified) barrel No. 3

Average velocity at end of test - 2167 fps

The above velocities were recorded using ball type ammunition in each caliber.

Complete round-by-round data of all penetration firing are enclosed as Appendix P.

Penetration Summary

Table I

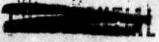
Target: 1-Inch pine boards placed 1 inch apart.

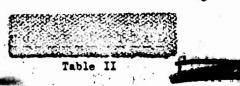
Result is the average number of boards penetrated in 10 true hits on the target.

RANGE	CALIBER	.30, T65, AMM	UNITION	CALIBE	R .280, ALMUN	NITION
YARDS	BALL	ΚP	API	BALL	AP	API
25	47.25	37.00	17.25	39.50	37.50	39.75
100	43.00	42.50	33.25	33.50	31.25	34.75
300	30.75	30.75	34.75	25.50	22.75	22.75
600	16.00	16.00	18.25	14.25	11.75	10.75
800	8.50	8.50	11.25	8.75	7.75	10.00
1000	5.00	6.00	8.50	6.00	5.00	7.25
1200	4.00	4.00	6.50	4.75	2500	5.00
1600	2.50	3.00	3.75	3.00	3.00	121,3.00
SC30	1.25	1.25	1.50	1.75	4	

The above table is illustrated graphically and is emolosed as part of append







auge mild steel plates, 4 inches apart.

Result is the average number of plates penetrated in 10 true hits on the target.

RANGE	CALIBER	.30, T65 AMMU	NITION	CALIBE	R .280 AMMUNI	TION
YARDS	BALL	AP	API	BALL	AP	API
25	3.0	3.5	5.5	2.1	3.0	4.1
100	3.2	4.9	4.6	2.0	3.4	4.0
300	2.7	3.1	3-4	1.0	2.2	2.3
500	1.5	1.9	1.9	1.0	1.0	1.0
500	1.0	1.0	1.0	1.0	1.0	0.5
1000	0.1	0.1	1.0	0 .	0	0
1200			0		•••	

The above data are illustrated graphically and is enclosed as part of Appendix Q.

Table III

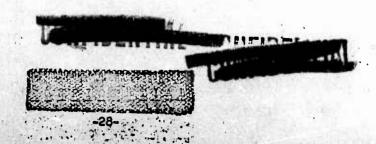
Target: 1-1/2-Inch homogeneous hard armor.

Result is the average inches of penetration achieved from 10 rounds.

Range 100 Yards

ANGLE OF	CALIBER	.30, T65 AMM	UNITION	CALIBE	R .280 AMMUN	ITION
OBLIQUITY	BALL	AP	API	BALL	AP	API
Hormal	.237	•590	•550	•039	•375	•393
200	.165	•556	•543	.025	•387	. 384
30° 40°	•056 •057	•556 •134	•171 •109	.020 .016	•178 •153	.168

The above data are graphically illustrated and is enclosed as part of Appendix Q.





Following is a summary of results obtained when firing against Helmet, M1 and Vest, Armor, M12.

		PE	RCENT OF RO	UNDS FIRED	ACHIEVING P	PENETRATION	
RANGE	1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	CA	LIBER .30,	T65		CALIBER .280	mevan
YARDS		BALL	AP	API	BALL	AP	API
600	Relmot	100	Not Fired	100	100	Not Fired	100
	Vest, Armor	100	Not Fired	100	100	Not Fired	100
800	Helmet	100	100	100	100	100	100
	Vest, Armor	100	100	100	70	80	40
1000	Helmet	100	Not Fired	100	100	100	100
	Vest, Armor	60	60	70	70	50	0
1200	Helmet	100	100	100	100	100	J
	Vest, Armor	0	0	20	20	0	0
1400	Helmet	0	40	100	0	0	0
	Vest, Armor	Not Fired		Not Fired	Not Fired	Not Fired	Not Fired
1600	Helmet	0	0	40	0	0	0
	Vest, Armor	Not Fired	Not Fired	Not Fired	Not Fired	Not Fired	Not Fired

Table Y

Target: Brick Wall, 8-1/2" Thick.

Result is the average depth of penetration in inches of five true hits on the target.

"Break through" expresses the total number of rounds required to obtain complete penetration of the wall. To obtain "break through", firing was done at a single aiming point.

RANGE	CA	LIPER .30, TE	5	•	CALIBER .280	
YARDS	BALL	AP	API	BALL	AP	API
25 100 300	4.40 4.10 2.80	4.65 3.60 2.75	4.90 4.35 3.00	3.40 · 4.15 2.35	2.95 4.00 1.40	2.88 2.80 1.03
500	2.00	2.17	Break Thro		1,000	1605
25 100	5 Rounds 10 Rounds	7 Rounds	6 Rounds	8 Rounds	9 Rounds 32 Rounds	14 Rounds

The caliber .280, AP and API required an excessively large number and the course yards for a break through. Because of the inaccuracy of the ammunition, and the course reticule of the sight, the gunner was unable to hold the impact in a small enough area to obtain a break through with the sight and the sight and the sight area.

12 data recorded calculations and the observing the control of the control of the function characteristics of the observing ammunition.

Summary of Function Results for Caliber .30, Caliber .280 and 7.92 mm Observing Ammunition

Range 1000 Yards

	TAR	GE T		TYPE		
AMMINITION		BRICK WALL	SAND PIT	CINDER ROAD	GRASSY FIELD	SCRUB BRUSH
Caliber .30	Rounds Functioned	25	2	6	1	0
	Rounds Failed to Function	2	16	12	19	7
	Total Rounds Fired	27	18	18	20	7
Caliber .280	Rounds Functioned	18	13	7	17	2
	Rounds Failed to Function	0	1	5	6	8
	Total Rounds Fired	18	14	12	23	10
7.92 mm	Rounds Functioned	10	10	13	9	6
	Rounds Failed to Function	0	0	0	0	4
	Total Rounds Fired	10	10	13	9	10

Against a hard target, the observing ammunition functioned with a large flash and a puff of white smoke. Against soft targets, such as sand or grassy fields, the flash was not visible, and the amount of smoke produced was smaller. This smoke was difficult to see from 1000 yards and would be practically impossible to pick up if the observer did not know where to look.

13. There follows a summary of velocity averages obtained from 20-round strings of ball ammunition fired from rifles used in this test and the 10th Report of Project TS2-2015. These data give a basis for evaluating the erosion caused by caliber .30, T65 ammunition and that by caliber .280 ammunition when fired from these respective rifles.

Complete velocity data are enclosed as Appendix S.

Summery

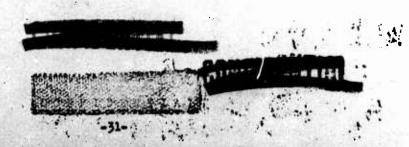
Complete velocity data of all weapons undergoing test. All velocities are given 78 feet from the muzzle in feet per second.

PREVIOUS ROUNDS	AVERAGE	MAXIMUM	MINIMUM	EXTREME VARI	LAT ION	STANI	MR D DEVI A	TION
7 6415	2686 2675	2762 2703	2643 2627	11ber .30, 125	, No. 1	4	32.0 18.1	
		1	20000		CON			



PREVIOUS	ATT DI CD	TALL WITHOUT	WTWTHIN	TERROR VARIATION	COLUMN DO DOWN A REAL
ROUNDS	AVF PAGE	MAXIMUM	MINIMUM	EXTREME VARIATION	STANDARD DEVIATION
to a fact of		arie, Li	ghtweight, (Caliber .30, T25, No	. 10
		0.000	0/05		00.1
117	2737 2754	2775 2779	2695 2722	70 57	22.4 17.0
707	2194	2117	E EE	ול	1/10
		Rifle, Li	ghtweight, (Caliber .30, T25, No	. 15
4	2670	2717	2640	77	17.1
6398	2702	2741	2680	61	22.3
		Auto R	Lfle, Calibe	er .280, EM-2, No. 6	
7	2214	2250	2157	93	22.3
6410	2202	2232	2150	82	20.0
		Auto Ri	ifle, Calibe	r .280, EN-2, No. 8	
10	2221	2342	2176	166	42.0
1278	2208	2268	2178	90	22.3
6399	2176	2247	5017	233	47.5
		Auto Ri	fle, Calibe	r .280, EM-2, No. 3	
242	2211	2298	2176	122	27.7
1006	2172	2253	2129	124	26.1.
		Auto Rifl	.e, Caliber	.280, FN (Long Mode)	1) No. 6
7	2237	2274	2175	99	24.5
6478	2200	2246	2152	94	22.5
		Auto Rifle,	Caliber .2	80, FN (Long Model)	No. 7
• 7	2245	2273	2220	53	16.4
6430	2200	2250	2160	90	20.8

Complete velocity and firing data recorded during burst fire of caliber .30 and caliber .280, M1919Ah modified machine guns are enclosed as Appendix T. There follows a summary of the above velocities.



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Barrels used in penetration phase firing ball ammunition.

Caliber .30, Barrel No. 3, Previous Rounds - 6273

ML	BURST 1	BURST 2
Average Velocity, fps Maximum Velocity, fps Minimum Velocity, fps Extreme Variation, fps	2683 2728 2614 84	2691 2738 2654 84

NOTE: 20-Round Burst

Caliber .280, Barrel No. 3, Previous Rounds - 6748

Average	Velocity, fps	2167
	Velocity, fps	2219
	Velocity, fps	2126
	Variation, fp	93

Average Velocities From Burst Fire on M1919A4, Caliber .30, Barrel Number 3

			AVERAGE VELOCITY
EURST	NUMBER OF ROUNDS	CALIBER .30	fps
1	20	AP	2698
1	5	API	2597
2	20	AP	2709
2	5	API	2689
3	20	AP	2711
3	5	API	2712
4	20	AP	27 IJ
4	5	API	2723
5	20	AP	2723
5	5	OBS	2708
6	20 "	AP	2734
6	5	OBS	2741
7	20	AP	2754
7	5	OBS .	2757
8	20	AP	2754
8	5	OBS	2748
9	120	AP	2750
9	30	API	2754
10	92	AP	DD4 - 2749
10	23	- Aller	L'ILLE L'ampetence
		7 18 W.	一
		*	





Average Velocities of Burst Fire on Caliber .280, Barrel Number 3

Bu	MULBER OF ROUNDS	CALIBER .280	AVERAGE VELOCITY fps
· /1	20	Ball	2177
1	5	API	2235
2	20	Ball	
2	5	API	22/19
3	20	Ball	2156
2 2 3 3	5	API	2256
4	20	Ball	2243
	5	API	2251
4 5 5 6 6	20	Ball	2257
5	5	OBS	1991
6	20	Ball	2245
6	5	OBS	19弘
7	20	Ball	. 2275
7	5	OBS	1922
8	20	Ball	2281
8	5	. OBS	1800
9	120	Ball	2312
9	30	API	2296
10	120	Ball	2314
10	30	OBS	1787
11	100	Ball	2263

One 100-round burst of linked, 4 to 1, ball and observing, was fired in a comparatively new barrel to investigate the excessive velocity drop of the observing round when fired from a warm worn barrel as noted above. It was observed that the observing ammunition as fired above was impacting 150 to 500 yards from the gun muzzle.

The caliber .280 barrel, number 4, with 355 previous rounds was utilized to investigate the above condition.

1	80	Ball	2260
1	20	Observing	2345

l4. Complete ballistic data, as computed by the Computing Laboratory of the Ballistic Research Laboratory of this station, are enclosed as Appendix U. The data from which the above computations were made are enclosed as Appendix V.

During the above firing the velocity recorded for caliber .280 ammunition was considerably higher than that recorded for the same ammunition fired from a velocity barrel. A limited investigation of this barrel (accuracy Barrel 450/3) was made by firing 20 rounds of ball ammunition for instrumental velocity at 78 feet. A check of the other available accuracy barrel (450/2) was conducted in the same manner.







The velocity results recorded in the above firing are as follows:

AMMUNITION: Cartridge, SA, Caliber .280, Ball, Lot 19A



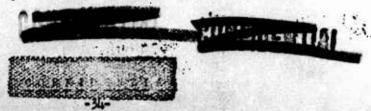
AMMUNITION TEMPERATURE: 70°F

	BARREL	
	450/2	450/3
Average Velocity, fps	2369	2336
Maximum Velocity, fps	2413	2391
Minimum Velocity, fps	2333	2307
Extreme Variation, fps	80	84

Complete velocity data are enclosed as Appendix W.

C. OBSERVATIONS

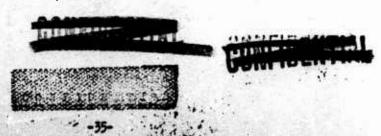
- 1. The following observations were made on the performance of Cartridge, Caliber .30, Ball, TlO4, Lot No. FA-X30-1358 as compared with Cartridge, SA, Caliber .280, Ball, Lot 19A.
- a. The average velocity of the caliber .30, ball ammunition at 70° F was 2771 feet per second and that of the caliber .280, ball ammunition was 2273 feet per second.
- b. The average pressure of the caliber .30, ball ammunition at $70^{\circ}F$ was 52,050 pounds per square inch and that of the caliber .280, ball ammunition was 43,100 pounds per square inch.
- c. An increase in the average velocity for both ammunition types was noted with an increase in ammunition temperature to $+165^{\circ}F_{\circ}$
- d. A smaller standard deviation in velocity existed for the caliber .30, ball ammunition at 470°F and +165°F.
- e. A decrease in average velocity was noted for both ammunition types fired at -65°F, the caliber .280 giving the smallest decrease. The standard deviation in velocity was less for the caliber .280, ball ammunition at this decreased temperature.
- f. Both ammunition types resulted in lower pressures and an increase in the standard deviation when fired at -65°F. The caliber .30, ball ammunition showed a decrease in average pressure coupled with a slight increase in standard deviation when fired at +165°F. The caliber .280, ball ammunition fired at this temperature resulted in a higher average pressure and decrease in standard deviation.







- g. The average mean radius of 10 targets fired at 600 yards from Mann barrels with caliber : 30, ball ammunition is 5.40 inches compared with 9.76 inches obtained uninficially 280 ammunition. This does not compare favorably with targets obtained using lead-core ball ammunition in either caliber. The average mean radius five targets fired with caliber .30, 150-grain lead-core ball ammunition, caliber .280, 130-grain lead-core ball ammunition, and caliber .280, 140-grain lead-core ball ammunition are 3.83 inches, 6.31 inches and 6.90 inches respectively.
- h. With respect to penetration of 1-inch pine boards placed 1 inch spart, the caliber .30, ball ammunition is superior to the caliber .280 ball ammunition from a 25-yard range to about 800 yards. From 800 yards to 2000 yards the penetration curves are very similar.
- i. With respect to penetration of 10-gauge mild steel plates placed 4 inches apart, the caliber .30, ball ammunition is superior to the caliber .280, ball ammunition at all ranges from 25 yards to 1000 yards. The caliber .30, ball ammunition compares with the caliber .280, AP against the above target.
 - j. With respect to penetration of 1-1/2-inch hard homogeneous armor at different angles of obliquity, from normal to 40 degrees, the caliber .30, ball ammunition is superior to the caliber .280, ball ammunition.
 - k. The caliber .30 and caliber .280, ball ammunition will defeat the Helmet, M1, from a range of 1200 yards and the M12 Armor Vest from about 1000 yards.
 - 2. The following observations were made concerning the performance of Cartridge, Caliber .30, AP, T93, Lot No. FA-X30-1357 as compared with Cartridge, SA, Caliber .280, AP, Lot No. 24A.
 - a. The average velocity of the caliber .30, AP ammunition at 70°F was 2822 feet per second and that of the caliber .280, AP ammunition was 2202 feet per second.
- b. The average pressure of the caliber .30, AP ammunition at +70°F was 51,270 lb per square inch and that of the caliber .280, AP ammunition was 39,200 lb per square inch.
- c. When fired at $+165^{\circ}F$ both calibers of ammunition showed an increase in average velocity and a decrease in the standard deviation, that of the caliber .30, AP being smaller than that of the caliber .280, AP.
- d. At -65°F both the caliber .30 and caliber .280, AP ammunition reacted similarly to the ball ammunition of each caliber fired at this temperature.

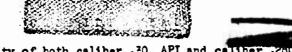




e. At +165°F the pressure from the caliber .30, AP ammunition was lower than 15°F the pressure of the caliber .280 ammunition increased with increase temperature. At -65°F the caliber .30 ammunition resulted in a decrease in pressure about equal to that encountered at +165°F. The pressure from the caliber .280, AP ammunition was not measured at -65°F.

- f. The average mean radius of ten targets fired at 600 yards from Kann barrels with caliber .30, AP ammunition is 5.92 inches compared with 11.32 inches obtained with caliber .280, AP ammunition.
- g. The caliber .30 and caliber .280, AP ammunition will defeat the Helmet, M1 from a range of 1200 yards. The above ammunition defeated the M12 Armor Vest from a range of 800 yards.
- h. With respect to penetration of one-inch pine boards placed one inch apart, the caliber .30, AP ammunition is slightly superior to the caliber .280, AP ammunition at all ranges from 100 to 1200 yards. This superiority decreases with increase in range to 1600 yards where penetrations at that point and above are substantially the same. At 25 yards range the penetrations achieved by the caliber .30, AP ammunition were less than those achieved at 100 yards. This was apparently caused by the instability of the projectile at 25 yards.
- i. With respect to penetration of 10-gauge mild steel plates placed 4 inches apart, the caliber .30, AP ammunition exhibits slightly better penetration characteristics than the caliber .280, AP up to 600 yard ranges. At 800 yards to 1000 yards, penetration characteristics of the two calibers are the same. As in firing against the duplex wood target, the penetration achieved at 25 yards with the caliber .30, AP was inferior to that at 100 yards.
- j. With respect to penetration of 1-1/2-inch hard homogeneous armor at different angles of obliquity, the caliber .30, AP ammunition was superior to the caliber .280, AP ammunition at normal, 20 and 30 degrees. At 40° angle, little difference existed in the penetration achieved, the caliber .280 showing up slightly better.
- 3. The following observations were made concerning the performance of Cartridge, Caliber .30, API, T101, Lot No. FAX30-1356 as compared with Cartridge, SA, Caliber .280, API, Lot No. 23A.
- a. The average velocity of the caliber .30, API ammunition at \star 70°F was 2739 feet per second and that of the caliber .280, API ammunition was 2196 feet per second.
- b. The average pressure at 70°F of the caliber .30, API ammunition was 50, 390 pounds per square inch and that of the caliber .280, API ammunition was 39,500 pounds per square inch.





- d. The relation of pressure to temperature was similar to that encountered for ball and AP ammunition in each caliber.
- e. The average mean radius of five targets fired from Mann barrels at 600 yards range is 6.48 inches for the caliber .30, API ammunition and 7.22 inches for the caliber .280, API ammunition. This figure of 7.22 inches for the caliber .280, API ammunition is better than that for the caliber .280, ball or AP ammunition which was 9.76 inches and 11.32 inches respectively.
- f. With respect to penetration of one-inch pine boards placed one inch apart, the caliber .30, API ammunition is superior to the caliber .280, API ammunition at ranges greater than 100 yards. This superiority, greatest at 300 yards, decreases with increase in range up to 2000 yards, where penetration performance is about the same. At ranges less than 300 yards some caliber .30, API rounds function after penetrating about 12 boards and their penetration characteristics are lost. The caliber .280 ammunition did not function on this type target at any ranges fired. As a result the caliber .280 penetration performance is superior to that of the caliber .30 ammunition at ranges of 25 and 100 yards.
- g. With respect to penetration of 10-gauge mild steel plates placed 4 inches apart, the caliber .30, API ammunition is superior to the caliber .280, API ammunition at all ranges from 25 to 1000 yards.
- h. With respect to penetration of hard homogeneous armor at angles of obliquity from 0 to 40 degrees, the caliber .30 ammunition is superior to the caliber .280 ammunition at all angles except 40 degrees. At 40 degrees the penetration achieved by the caliber .280 is .166 inches and that by the caliber .30 is .109 inches.
- i. The caliber .30, API projectile will defeat Helmet, M1 at 1400 yards and the M12 Armor Vest at 1000 yards. (7 out of 10) The caliber .280, API projectile will defeat Helmet, M1 at 1000 yards and the M12 Armor Vest at 600 yards.
- j. During the tank ignition firing, the following general observations were made:

(1) Sensitivity

At 100 yards, functioning of the caliber .280 projectile generally occurred at the plate with flash being visible both on the face of the plate and between the plate and can. Functioning of the caliber .30 projectile appeared to be somewhat slower, the flash usually occurring behind the can. At ranges of 300 yards and 500 yards, this difference was less pronounced; however, the caliber .280 projectile still tended to give greater than on the face of the plate than did the caliber .30 projectile.



(2) Size and color of flash



In general, flash obtained from caliber .30 projectiles was that from caliber .280 projectiles at all ranges. A difference in color from each of the two types of projectiles was noticeable. The flash from the caliber .30 type was slightly red in color whereas a white flash was obtained from the caliber .280.

(3) Size and color of flash smudge on the can

At all ranges the flash smudge around the bullet-entrance hole in the can was larger with the caliber .30 ammunition than with the caliber .280 ammunition. Flash smudge from the caliber .30 round was generally black in color whereas that from the caliber .280 round was usually gray or light gray.

k. With respect to actual fuel ignition, the caliber .280, API ammunition had a higher percentage of ignitions below fuel level at all ranges than did the caliber .30, API ammunition. Above fuel level the ignition performance of both ammunition is about the same.

4. The following observations were made with respect to Cartridge, Caliber .30, Tracer, Tl02, Lot No. FAX30-1359 and Cartridge, SA, Caliber .280, Tracer, Lot No. 32A.

a. The caliber .30, T65 traced an average length of 879 yards while the caliber .280 traced an average length of 1061 yards.

b. The caliber .30 tracer reached its maximum brilliance after travelling an average distance of 50 yards. The caliber .280 tracer reached its maximum brilliance after travelling an average distance of 64 yards.

- c. The caliber .30 trace is dull red in color while the caliber .280 trace is rose red. The caliber .280 trace is more brilliant than that from the caliber .30 and remains at a more uniform brilliance until it burns out.
- d. The igniter of the caliber .280 tracer burns invisibly while that from the caliber .30 ammunition burns leaving a dim trace. Ignition of the caliber .280 tracer mixture also appears to occur with greater rapidity than that of the caliber .30 ammunition. This was especially noticeable in that the caliber .280 tracer mixture burned with maximum brilliance almost immediately on igniting while the caliber .30 projectile traveled some distance before maximum brilliance of the tracer mixture was reached. This difference was accentuated by the 400-feet per second velocity difference in the two projectiles.

e. The percent of rounds tracing was 100 in the case of the caliber .30 ammunition and 99 in the case of the caliber .280 ammunition.



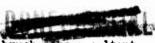
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f. The average mean radius of five targets first from Mann barrels fas 11.24 inches for caliber .30, tracer ammunition and 10.78 inches author .280, tracer ammunition.

- g. The average velocity at 70°F of the caliber .30, tracer ammunition was 2629 feet per second as compared with 2248 feet per second obtained with the caliber .280, tracer ammunition.
- h. The average pressure of the caliber .30, tracer ammunition fired at +70°F was 42,885 pounds per square inch. The pressure resulting from firing the caliber .280, tracer ammunition was not obtainable with available facilities, therefore, it was not possible to fire this phase. From observations based on correlation with the velocity data, the pressure would probably be on the order of 36,000 pounds per square inch.
- i. The velocity of both types of ammunition increased with increase in temperature and decreased with a decrease in temperature. The standard deviations for both types of ammunition were substantially the same, the caliber .30 being slightly better at $-65^{\circ}F$.
- 5. The following observations were made with respect to Cartridge, Caliber .30, Spotting, TlO3, Lot No. 2, Cartridge, SA, Caliber .280, Observing, Lot No. 17A and the 7.92 mm German observing cartridge.
- a. The average velocity of the caliber .30, spotting ammunition at +70°F was 2726 feet per second and that of the caliber .280, observing ammunition was 2340 feet per second.
- b. The average pressure at 70° F of the caliber .30, spotting ammunition was 42,185 pounds per square inch and that of the caliber .280, observing ammunition was 38,500 pounds per square inch.
- c. With decrease in temperature, both calibers of ammunition resulted in decreased velocity. The standard deviation of both calibers of ammunition was substantially the same at -65°F and +70°F. (NOTE: Observing ammunition was not fired at +165°F.)
- d. Pressures of both calibers of ammunition decreased with decrease in temperature with little change in the standard deviation.
- e. The 7.92 mm was most sensitive to initiation, the caliber .280 next and the caliber .30 least sensitive to initiation.
- f. Against hard targets, such as a brick wall or cinder road, the flash and resultant smoke from all three observing rounds are sufficient to permit observation from 1000 yards.



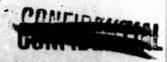


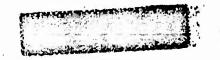
Against soft targets, such as sand or scrub brush, the resultant rounds is difficult to see from 1000 yards.

h. The smoke producing agent from caliber .30 and caliber .280 observing ammunition scatters more on functioning than that from the 7.92 mm ammunition. This results in a thin smoke from the caliber .30 and caliber .280 ammunition as compared with the 7.92 mm ammunition.

The following general observations were made:

- a. When fired from barrels of the same length, (modified M1919AL) barrels) the muzzle flash from the caliber .30 ammunition is greater than that from the caliber .280 ammunition. This includes the tracer ammunition of both calibers which are both loaded with an IMR type powder.
- b. When the ball ammunition is fired from rifles, with a barrel length designed for the respective caliber of ammunition, the caliber .30 ammunition results in more muzzle flash.
- c. The muzzle smoke resulting from a 75-round burst of caliber .30, AP ammunition fired from an M1919AL machine gun is darker and greater in volume than that resulting from a 75-round burst of caliber .280, AP ammunition.
- d. The muzzle smoke, resulting from a 75-round burst of caliber .30, tracer ammunition fired from a M1919A4 machine gun, is substantially the same as that from a 75-round burst of caliber .280, tracer ammunition.
- e. When firing the caliber .30 ammunition, loaded with ball powder, from a machine gun located in a firing house, the resultant smoke was extremely irritating to the gun crew. If fired from an enclosed position, such as a tank turret, the smoke would possibly prohibit any large volume of fire.
- f. Throughout the test program, differences in the color code marking of the U. S. caliber .30 and U. K. caliber .280 ammunition resulted in unnecessary delays in properly identifying different type rounds.
- g. All penetration results obtained from firing at an 8-1/2 inch brick wall were quite erratic. It is felt that the erratic behavior was not caused by the ammunition undergoing test but by the type of target utilized. Sections of the particular wall used were built from different quality bricks. All bricks in the wall looked the same; however, they were of different densities and hardnesses. Since each recorded shot hit a different brick the conditions encountered by each bullet were different.
- h. With respect to the grenade launching cartridges tested the caliber .280 cartridge in the EM-2 rifle was not satisfactory. The same cartridge in the FN rifle was satisfactory and gave longer ranges than the caliber .30, T65 grenade launching cartridge used in the T25







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NAME

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Mr. F. X. Wolfe
Brig. J. A. Barlow
Major J. F. May
Brig. J. A. Barlow Major J. F. May Mr. H. W. Duneclift
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QMSI D. T. Maber
Major F. R. Milive
Capt. R. M. MagGibbon
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Col. R. Studler
Col. J. W. Hammond
Brig. G. Morrison
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Major F. M. Beal
Major Hope
Major Miller
M/Sgt. R. Hawkins
Mr. A. Benson
Mr. J. Kirk

REPRESENTING

British Army Springfield Armory British Army Canadian Army Canadian Army Springfield Armory OCO, ORDIS OCO, ORDIS Canadian Army Canadian Army Canadian Army Great Britain Springfield Armory British Army British Army British Army OCO, ORDIS British Army British Army British Army British Army British Army U. S. Air Forces Frankford Arsenal Frankford Arsenal Frankford Arsenal

IV CONCLUSIONS

A. It is concluded that:

1. All ammunition undergoing test is reasonably stable at -65°F, +70°F and +165°F.

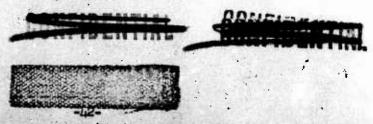






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- 3. The accuracy of all types of caliber .30, T65 ammunition undergoing test fired from Mann barrels is *satisfactory.
- 4. The accuracy of caliber .280 ball and AP ammunition undergoing test is not *satisfactory, however, it probably can be improved by further development and refinements in manufacture. The accuracy of other types of caliber .280 ammunition, (API, tracer, and observing) undergoing test is satisfactory.
- 5. The caliber .30, T55 ammunition produces more muzzle smoke and flash than the caliber .280 ammunition.
- 6. The smoke resulting from caliber .30 ammunition loaded with ball type powder is irritating to the threat and possibly has a serious toxic effect.
- 7. The ballistic coefficients of all types of caliber .280 ammunition undergoing test are superior to those comparable types of caliber .30, T65 ammunition tested.
- 8. Because of this difference in ballistic coefficients, the remaining velocity of the caliber .30, T65, ball, AP, and API ammunition decreases at a more rapid rate than do the caliber .280 bullets. At about 1000 yards, the remaining velocities of comparable types in the two calibers are about equal in spite of the higher muzzle velocity of the caliber .30, T65 Ammunition.
- 9. The above facts are further illustrated by reference to the penetration performance obtained at ranges above 1000 yards.
- 10. The caliber .30, T65, ball, AP and API ammunition develop from 45 to 73 percent more muzzle energy than do comparative types of caliber .280 ammunition.
- 11. The maximum range of the caliber .30, T65 and caliber .280, ball ammunition is about 3000 yards.
- 12. The trajectory of the caliber .30, T65 ammunition is considerably flatter than that of the caliber .280 ammunition at ranges considered practical for rifle fire.
- 13. The caliber .280, API ammunition exhibits superior fuel ignition characteristics compared with the caliber .30, T65, API ammunition.
- * Satisfactory as used in this instance is defined as being within the present accuracy specifications for caliber .30 ammunition.







14. The performance of both caliber .30, T65 and caliber .280, tracer ammunition is satisfactory; however, the .280 gave the best performance.

15 or the citiber .30, T65 spotting ammunition is not satisfactory. The function is characteristics of the caliber .280 observing ammunition compare favorably the terman 7.92 mm observing ammunition as regards functioning and visibility; however, the caliber .280, observing is susceptible to premature functioning.

16. Those caliber .200 barrels, 450/2 and 450/3, used in the accuracy, maximum range and time of flight firing gave a higher velocity level than the pressure and velocity barrels. This difference is possibly due to some difference in the bore dimensions of the subject barrels.

V RECOMMENDATIONS

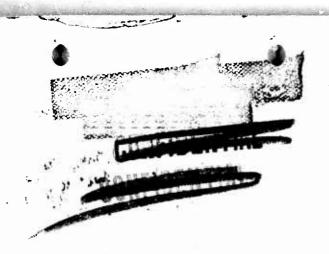
- A. If any tests of this nature are conducted in the future it is recommended that:
- 1. Amminition to undergo test be identified with the standard U. S. color code marking for ammunition.
- 2. Pressure, velocity, and accuracy equipment be of the same type to eliminate any variable caused by different test procedures.
- 3. A member of the testing organization be allowed to attend any future meetings involving preparation of technical test plans.
- 4. In any future development of weapons and ammunition by the U. K. and U. S., every effort be made to perfect the ammunition prior to designing the weapon.
- 5. Before weapons of any type are considered for joint comparison trials by U. K. and U. S., they should be chambered for a common round of ammunition, which is acceptable to both countries.

APPROVED:

F. COLLERAN Director, Dev. & Proof Services H. F. BIVELOW
Lt. Col., Ord. Dept.,
Chief, Arms & Am. Div.

WALTER DUGGAN lst Lt., Ord. Dept., Proof Officer

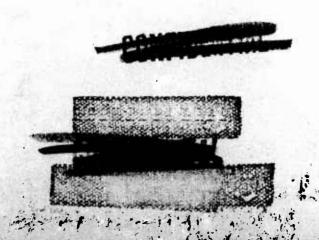
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APPENDIX A

Directive Letter

00 FILE 474/2 (c), APJ FILE (c) 474/21





OFFICE OF THE CHIEF OF ORDNANCE
WASHINGTON 25. D. C.

RECORD ACBonkems yer/bhy/3085

OO FILE L7L/2 / ATTN: ORDITS
APG FILE (c) L7L/21

3 February 1950

SUBJECT: Comparative Tests of Light Rifles (Project TS2-2015, Priority 1-0)

TO: Commanding Officer
Aberdeen Proving Ground, Md.

1. Reference is made to file APG (c) 474/14 (0.0. 474/317 - C), basic dated 2 Nov 1949, and file APG 474.1/144 (0.0. 474/1368), regarding comparative tests of United States and United Kingdon lightweight rifles and ammunition. It is requested that necessary action be taken by the Proving Ground to conduct these tests.

Ammunition Test will be conducted concurrently, and that an estimated time of one hundred sixty-eight (168) working days will be required for completion of the tests. It has been agreed by representatives of the United States and the United Kingdom that the tests will begin on 14 February 1950, and that the test materiel will be delivered to the Proving Ground prior to that date.

3. Copies of the agreement covering these tests and the detailed plans of tests are attached herewith for retention by the Proving Ground.

BY COMMAND OF MAJOR GENERAL FORD:

3 Incls

1. Cy of Agreement

2. Cy Phase II Ammunition Test

3. Cy Technical Test

RENE' R. STUDIER Colonel, Ord Dept Assistant



45



29 Sep 49

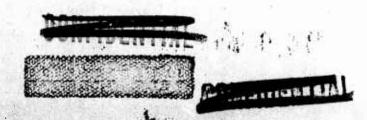
PLAN OF TEST OF NEW US AND UK RIFLE AMMUNITION

PHASE II



INDEX OF TESTS

Test No.	Abbreviated Title of Test
1.	Penetration
2.	Wounding or stopping power
	Accuracy, Mann barrel
3. 4. 5. 6. 7. 8.	Grenade ammunition, functioning of
5.	Range tables
6.	Pressure data
7.	Erosion
8.	Accuracy, worn barrel, -65°F
9.	Storage, effect on functioning
10.	Maximum range
11.	Flash and smoke
12.	Tracer, API, observing bullet, functioning





PHASE II (To be conducted at Aberdeen, Maryland)

PRIORITY - A

Test No. 1

Purpose: To determine the penetrating power of comparable types of AP, API and Ball (Mild steel core) at ranges of 25, 100, 300, 600, 800, 1000, 1200, 1600 and 2000 yards against 10 gage mild steel plates 4 apart, 1 deal boards spaced 1 apart, burned brick masonry, body armor and helmets. Each type of subject ammunition will be fired against armor plate at a range of 100 yards to determine the maximum penetration at angles of attack of normal, 20, 30, and 40 degrees. The maximum penetration will be considered to have been obtained when 7 rounds out of a series of 10 rounds have defeated the thickest homogenous hard armor. Tests of penetration will be discontinued when limits of penetration have been obtained.

Test No. 2

Purpose: To determine the shock effect (wounding or stopping power) of the several types of combat ammunition.

Test No. 3

Purpose: To determine the accuracy of all test ammunition when fired from a Mann barrel at 600 yerds.

Test No. 4

Purpose: To determine the range, accuracy istics of grenade ammunition.

Minimum -- III-or-

PRIORITY - B

Test No. 5

Purpose: To provide data for preparation of range tables for all



14 Oct 49

Range tables will be provided for AP, API, ball, tracer and observing rounds.

Test No. 6

Purpose: To determine the pressure curve of test amunition in rifle barrels at different stages of wear and at temperature of 70°F., -65°F. and 125°F.

Method: One each reasonably new, 1/2 worn, and last 1/4 of life barrels will be used.

Test No. 7

Purpose: To determine the comparative erosions of barrels in different stages of firing conducted in above tests by recording velocity drop or accuracy change.

Test No. 10

Purposes To determine the maximum flight of all types of combat ammunition.

Test No. 11

Purpose: To determine the comparative flash and smoke of the tested ammunition.

PRIORITY - D

Test No. 12.

Purpose: To determine the functioning characteristics of tracer, observing and API ammunition.

Observing ammunition will be tested against targets and at ranges



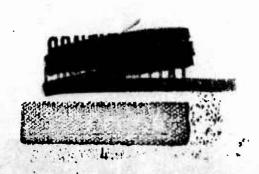


as in Test No. 1 above, as well as against plough lard, downland or prairie and rocky soil or shingle, at ranges of 1000, 1200, 1600 and 2000 yards. The German spotting round will be used as test control item. This control ammunition to be furnished by UK. API ammunition will be fired against fuel at various temperatures. Ammunition will be fired at temperatures of -65, +70 and +125 F. Ammunition will be tested both in new and worn barrels.

NO PRIORITY

Test No. 13

Purpose: To record all malfunctions of ammunition and weapons and the causes therefor.





29 Sep 49



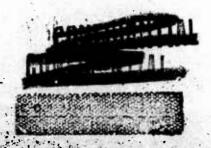
TECHNICAL TEST TEA

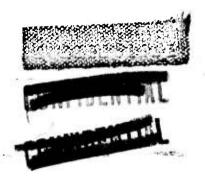
INDEX OF TESTS

Test	No.	Abbreviated Title of Test
Par.	1	Materiel to be submitted for test
Par.	2	Standard Light Automatic Rifle Test (See below for detailed index)
Par.	3a	Penetration, normal conditioning
Par.	36	Penetration, worn barrel, -65°F.
-Par-	3c	API, tracer and observing cartridge efficiency
Par.	3d	Remaining velocity
Par.	4	Demonstration of converted weapons

(In below, SLART refers to appropriate test in Inclosure 1, STANDARD LIGHT AUTOMATIC RIFLE TEST)

SLART	I	Physical characteristics
SLART	11	Assembly and disassembly
SLART	III	Preliminary function fire
SLART	IV	Cook-off
SLART	V	Dust test
SLART	VI	Mud test
SLART	VI I	Rain test
SLART	VIII	Grenade launching
SLART	IX	Functioning and cyclic rate, at angles and various temperatures
SLART	X	Accuracy
SLART	XI	Endurance
SLART	XII	Cmitted
SLART	XIII	Flash
SLART	XIV	Function in cold
SLART	XV .	Immersion in sea water
SLART	IVK	Salt spray
SLART	IIIVX	Function without lubrication
SLART	XIX	Determine the recoil energy of test rifles and ammunition
SLART	XX	Determine the recoil energy of test rifles when firing grenades

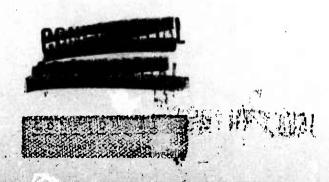


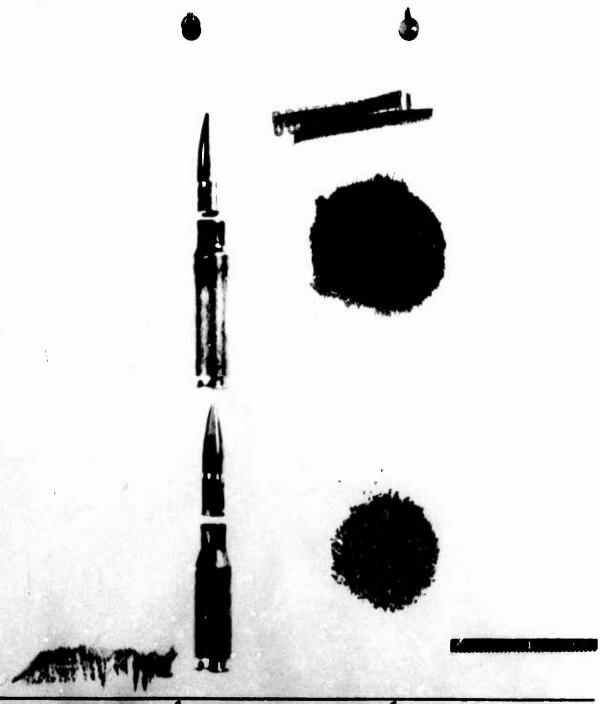


APPENDIX B

Cartridge Components

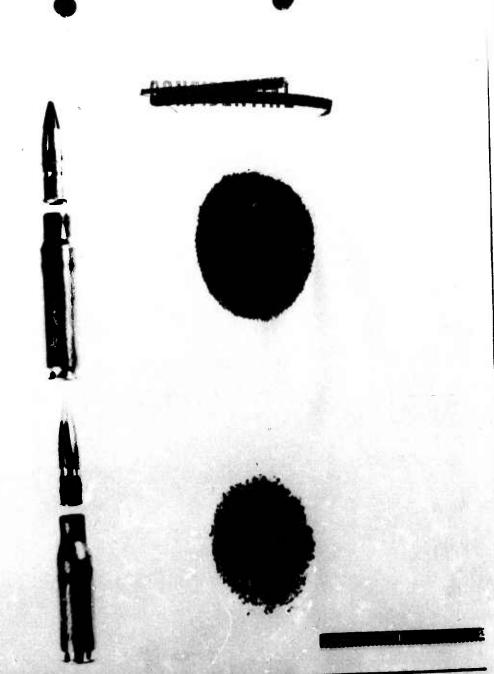
Photographs - A61236 A61237 A61238 A61239 A61240





A61236

Project No. TS2-2015. 9th Report. Cartridge Components: (TOP) Cartridge, Ball, Caliber .30, T104, Lot No. FA-X30-1358. (BOTTOM) Cartridge, SA, Ball, Caliber ,280, Lot No. 194



A61237

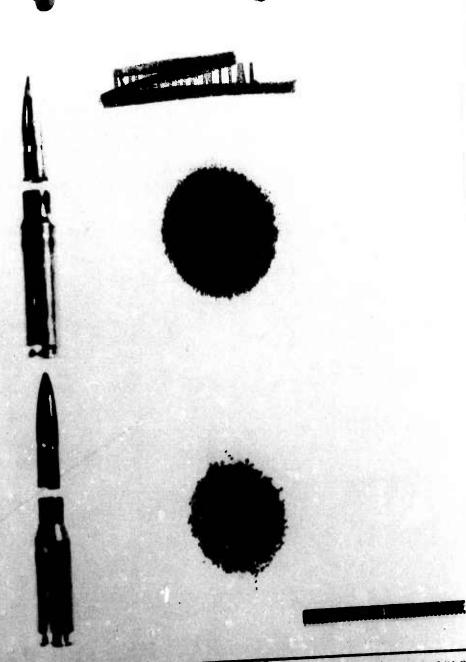
ABERDEEN PROVING GROUND 8

12 April 1950

Project No. TS2-2015. 9th Report. Cartridge Components: (TOP) Cartridge,

AP, Caliber .30, T93, Lot No. FA-X30-1357. (BOTTOM) Cartridge SA, AP,

Caliber .280, Lot No. 24A.



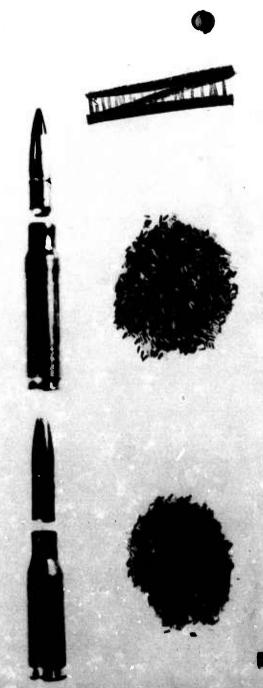
A61238

A61238

A61238

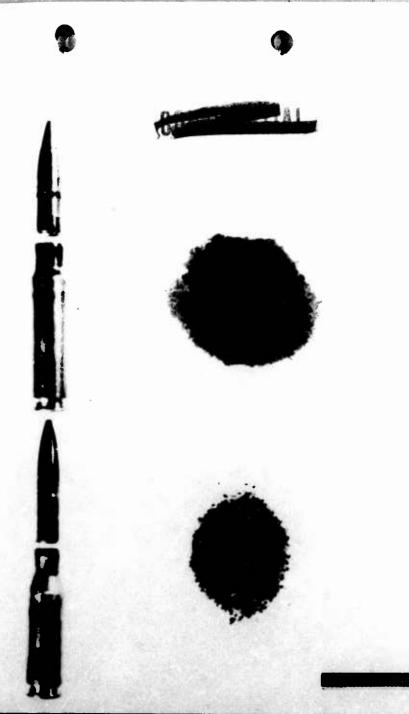
A61238

Project No. TS2-2015. 9th Report. Cartridge Components: (TOP) Cartridge, API, Caliber .30, T101, Lot No. FA-X30-1356. (BOTTOM) Cartridge, SA, API, Caliber .280, Lot No. 23A.



A61239

Project No. TS2-2015. 9th Report. Cartridge Components: (TOP) Cartridge, Tracer, Caliber .30, T102, Lot No. FA-X30-1359. (BOTTOM) Cartridge, SA, Tracer, Caliber .280, Lot No. 324.



A6 1240

ADERDEEN PROVING GROUND 3

12 April 1950

Project No. 752-2015. 9th Report. Cartridge Components: (TOP) Cartridge, Spotting Caliber .30, 7103, Lot No. 2. (BOTTOM) Cartridge, SA, OBS, Caliber .280, Lot No. 17A.



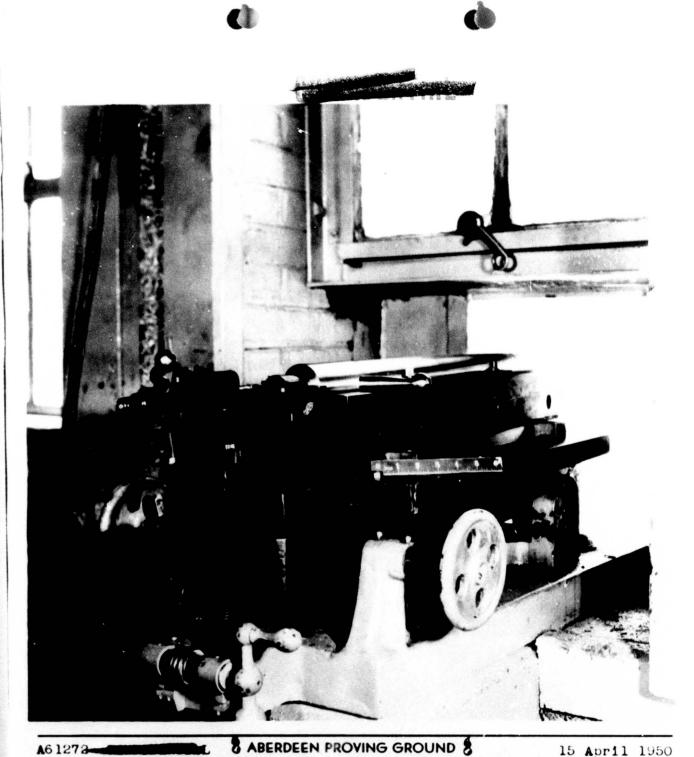
APPENDIX C

Pressure, Velocity and Accuracy Weapons

Photographs - A61272 A61273 A61274 A61275 A61278

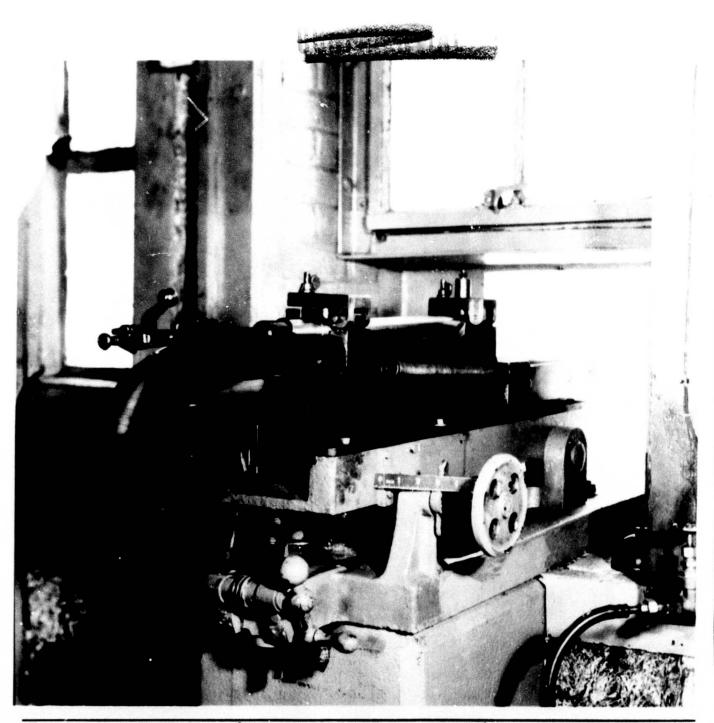






Project No. TS2-2015. 9th Report. Accuracy Rifle: Caliber .280, Mann Barrel Fitted to P-17 (Enfield) Action Realing in a Ver Slide. Note method of adapting slide to FA Rest.

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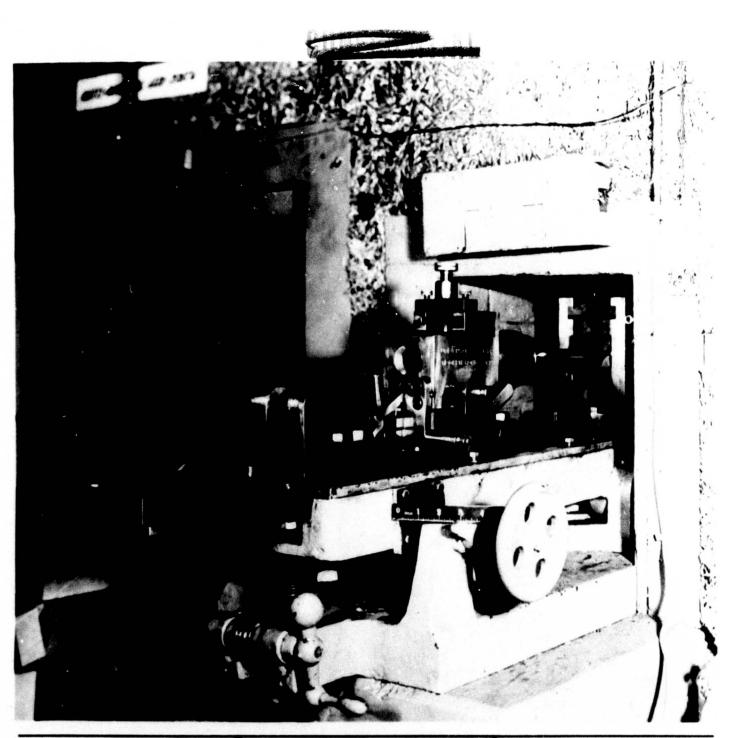
A61273

ABERDEEN PROVING GROUND

15 April 1950

Project No. TS2-2015. 9th Report. Accuracy Min. Caliber .30, Modified M1919A4

Barrel Chambered for T65El Cartridge Titted to Springfield Action Mounted in Recoil Rest Supported on FA Rest.

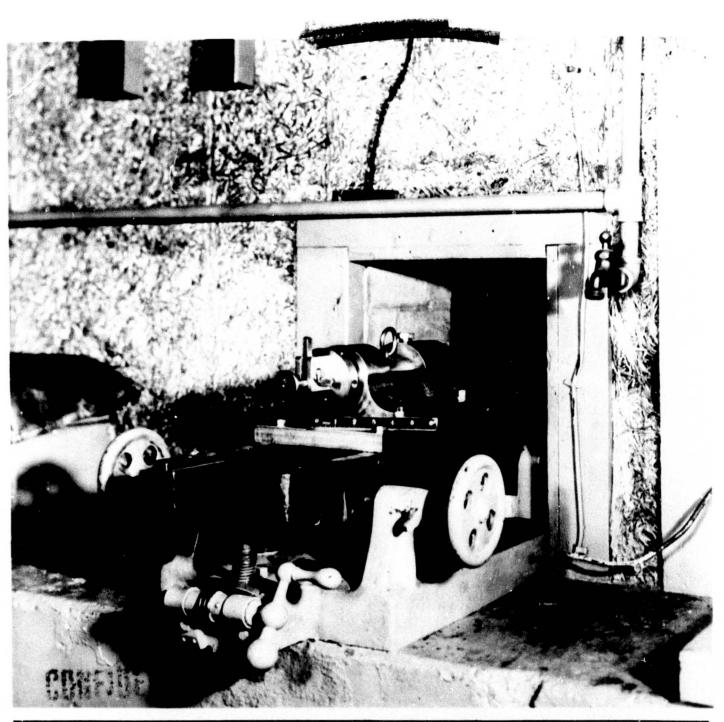


A61274

C ABERDEEN PROVING GROUND

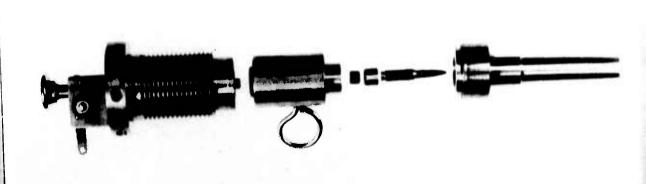
15 April 1950

Project No. TS2-2015. 9th Report. Proceeding apon: Caliber .30 Pressure Barrel Fitted to M-2 Universal Beeffver. West on mounted in a recoil rest supported by a FA Rest.



A61275 ABERDEEN PROVING GROUND 15 April 1950
Project No. TS2-2015. 9th Report. Ordnance Rectory Pressure Housing:
Caliber .280 Barrel Fitted to Housing. Note adaption of housing to FA
Rest.





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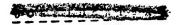


A6 1278

A6 1278

A6 1278

Project No. 782-2015. 9th Report. Ordered Tabler Pressure Housing:
Disassembly of (less housing). California and the common second secon







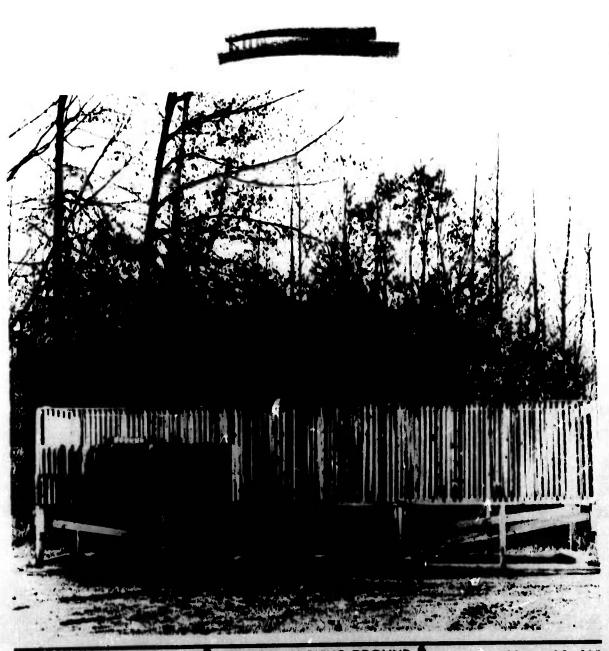
APPENDIX D

Penetration Target

AFG Photograph No. A61221

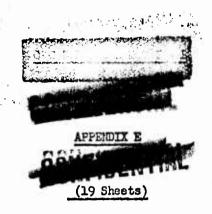






()

A6 1221 ABERDEEN PROVING GROUND 11 April 1950
Project No. TS2-2015. 9th Report. Penetrope (8 de View), One
Inch Pine Boards Spaced One Inch Apart.



MANN BARREL ACCURACY FIRING DATA

The following abbreviations are utilized:

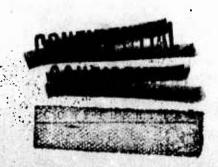
M.R. - Mean Radius in inches

M.V.D. - Mean Vertical Dispersion in inches

M.H.D. - Mean Horizontal Dispersion in inches

E.V.D. - Extreme Vertical Dispersion in inches E.H.D. - Extreme Horizontal Dispersion in inches

E.S. - Extreme Spread





FIRING AND ACCURACY DATA FOR 600 YARD MANN BARREL FIRING

RIFLE, ACCURACY, CAL. .30, No. 1528385 MOUNTED IN REST, RECOIL, ACCURACY, CAL. .30

MIA

CAL. 280 MANN BARREL NO. 450/2 FITTED TO A P-17 RECEIVER (ENFIELD, CAL. 30 ACTION).

WEAPON SUPPORTED BY VEE SLIDE NO. 101

DATE: 21 February 1950

TELP: 38°F

WIND VELOCITY: 6 to 8 mph

DENSITY: 1.093

PREVIOUS ROUNDS: Cal. .30 Weapon - 421

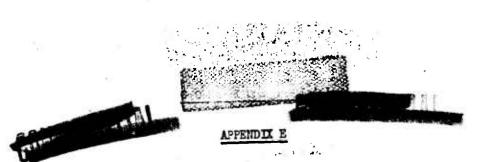
Cal. 280 Weapon - 23

TARGET NO. 1 - 1450 HOURS

	CAL30 BALL, T104 LOT FAX 30-1358	CAL280 BALL LOT 19A
L.R.	5.65	10.03
M-A-D	2.81	7.88
M.H.D.	2,44	5.44
E.V.D.	18.71	<i>3</i> 0 . 77
E.H.D.	18,20	24.00
E.S.	20,63	35.39
	TARGET NO. 2 - 1502 HOURS	·
M.R.	6.41	14.06
u.v.D.	3.76	8.58
M.H.D.	4.40	7.66
E.V.D	17.40	35.27
-	28.80	42.78
E.H.D.		47.60
E.S.	32,10	41,000







TARGET NO. 3 - 1512 HOURS

	CAL30 EALL, T104 LOT FAX 30-1358	CAL280 BALL LOT 19A
M.R.	5.77	8.42
M.V.D.	2.38	6.29
U.H.D.	2.48	3.82
E.V.D.	11.18	32.95
E.H.D.	11.03	20.31
E.S.	12.60	33.00
	TARGET NO. 4 - 1522 HOURS	
M.R.	4.41	9.99
M.V.D.	3.00	6.54
M.H.D.	2.61	6.70
E.V.D.	14.15	21.31
E.H.D.	10.87	21.15
E.S.	15.98	23.15
	TARGET NO. 5	•
M.R.	4.92	13.68
M.V.D.	3.52	10.25
W.H.D.	2.94	5.46
E.V.D.	16.18	46.10
E.H.D.	13.99	27.42
E.S.	18.05	46.10





APPENDIX E

DATE: 17 April 1950 TELP: 66°F DENSITY: 1.035 WID: 6 mph DIRECTION: SW

DIRECTION FIRE: SSE

PREVIOUS ROUNDS: Cal. .30 Weapon - 92
Cal. .280 Weapon - 117

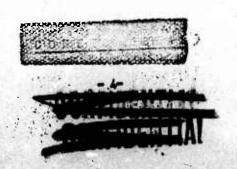
TARGET NO. 1 - 0935 HOURS

•		
	CAL30. AP, T93 LOT FAX 30-1357	CAL280, AP LOT 24A
M.R.	4.17	8.46
H.V.D.	3.31	6.86
M.H.D.	1.81	3.74
E.V.D.	16,90	23,25
E.H.D.	7.40	18.50
E.S.	17.00	25.00
	TARGET NO. 2 - 0945 HOURS	
M.R.	4.32	10.80
M.V.D.	3.13	4.92
H.H.D.	2,45	8,66
E.V.D.	15.48	18.94
E.H.D.	12.50	42.30
E.S.	15.47	44.00
	TARGET NO. 3 - 0950 HOURS	
M.R.	4.88	9.48
M.V.D.	3.40	7.14
M.H.D.	2.72 .	5.14
B.V.D.	17.47	28.91
E.H.D.	13.72	17.02
E.S.	18.95 . **	28,91
		3.7



TARGET NO. 4 - 1000 HOURS

9 101		
5	CAL30 AP, T93 LOT FAX 30-1357	CAL280 AP LOT 24A
M.R. M.V.D. M.H.D. E.V.D. E.H.D. E.S.	3.70 1.87 2.89 9.13 8.69 10.60	9.25 6.47 5.42 26.87 20.70 26.87
TARGET	No. 5 - 1005 HOURS	
M.R. M.V.D. M.H.D. E.V.D. E.H.D. E.S.	5.73 3.09 4.10 16.12 11.30 18.20	11.41 6.17 7.96 22.70 32.48 32.52





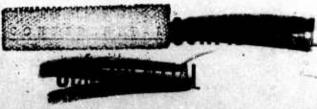
DATE: 17 April 1950 TELF: 69°F TENSITY: 1.026 WID: 8 mph DIRECTION: SW

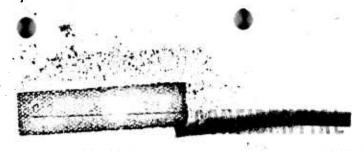
DIRECTION FIFE: SSE

PREVIOUS ROUNDS: Cal. .30 Weapon - 142
Cal. .250 Weapon - 166

TARGET NO. 1 - 1010 HOURS

	خواد المحدد الرسيدية المرادية بي المرادية أحداد المساكم الماثات ا	
	CAL30, API, TlOL LOT FAX 30-1356	CAL280, API LOT 23A
M.R.	6.42	7,12
M.V.D.	4.72	4.68
M.H.D.	3.99	3.84
E.V.D.	15.58	26.64
E.H.D.	15.85	19.40
E.S.	21.10	27.03
	TARGET NO. 2 - 1015 HOURS	
M.R.	7. 70	8.44
M.V.D.	5,42	6.36
M.H.D.	4.50	4.48
E.V.D.	19.53	23.62
E.H.D.	15.20	18,92
E.S.	20.37	24.10
	TARGET NO. 3 - 1025 HOURS	
M.R.	. 7 .2 7	7.78
M.V.D.	2.78	2,63
M.H.D.	6.64	6,21
E.V.D.	12,28	17.58
E.H.D.	22.15	16.65
E.S.	22,15	19.48
		15 Th
		-



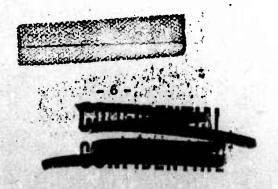


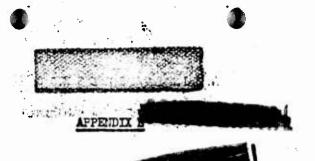
APPENDIX E



TARGET NO. 4 - 1030 HOURS

		CAL30, API, T101 LOT FAX 30-1356	CAL280, API LOT 23A
M.R.		4.89	6.00
M.V.D.		2.98	5.23
M.H.D.		3.24	1.87
E.V.D.		12.77	32.37
E.H.D.		14.00	7.35
E.S.		15.30	32.55
	TARGET NO. 5 - 1037 HOU	<u>rs</u>	
M.R.		6.14	6.76
M.V.D.		3.50	5.05
M.H.D.		4.17	3.40
E.V.D.		13.85	18.00
E.H.D.		18.75	15.45
E.S.		20.30	18.82





DATE: 17 April 1950
TELP: 68°F
DESITY: 1.012
WHD: 8 mph
DIRECTION: SW

DIRECTION FIRE: SSE

PREVIOUS ROUNDS: Cal. .30 Weapon - 193
Cal. .280 Weapon - 220

TARGET NO. 1 -1050 HOURS

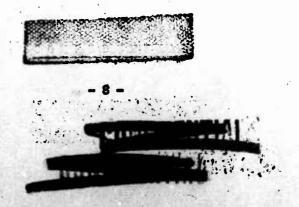
	CAL30, TRACER, T102	CAL280, TRACER
	LOT FAX 30-1359	LOT 32A

M.R.	13,23	10.02
M.V.D.	10,24	7.23
M.H.D.	7,27	5.78
E.V.D.	35,13	30.38
E.H.D.	24,35	25.33
E.S.	39.20	36,23
	TARGET NO. 2 - 1105 HOURS	
		*
M.R.	7.30	9.93
M.V.D.	3.86	4.50
M.H.D.	5.32	8.08
E.V.D.	25,10	20.69
E.H.D.	21.88	24.00
E.S.	28.80	28.00
	TARGET NO. 3 - 1110 HOURS	
	20./0	
M.R.	13.69	12.60
M.V.D.	9.83	7.70
M.H.D.	4.96	8,55
E.V.D.	35.85	24.87
E.H.D.	26.53	32.57
E.S.	57.23	33.85
	CALL POLICE CONTRACT CONTRACT	
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A PANES	The state of the s	Editor III



TARGET	MO.	I.	_	1115	POURS
IARUEI	RUA	4	_		TIOO IND

	CAL30, TPACER, T102 LOT FAX 30-1359	CAL280 TRACER LOT 32A
M.R.	12.13	10.03
M.V.D.	5.98	2.68
M.H.D.	9.16	7.32
E.V.D.	27.41	20.28
E.H.D.	34.00	38.07
E.S.	34.60	39.75
TAR	MET NO. 5 - 1122 HOURS	-
M.R.	9.85	11.33
M.V.D.	7.10	7.20
M.H.D.	5.68	7.08
E.V.D.	27.90	33.93
E.H.D.	24.75	29.62
E.S.	33.70	36.00





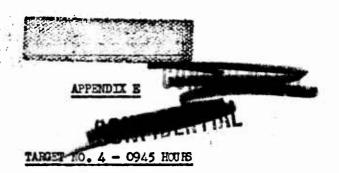
DATE: 18 April 1950
TELF: 70°F
DESITY: 1.008
WILD: 6 mph
DRUCTION: S

DIRECTION FIRE: SSE

PREVIOUS ROUNDS: Cal. .30 Weapon 298 Cal. .280 Weapon -328

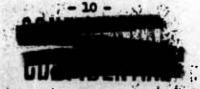
TARGET NO. 1 - 0930 HOURS

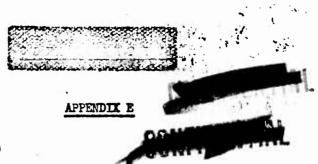
	CAL30, SPOTTING, T103 LOT NO. 2	CAL280 OBS
M.R.	7,20	8.36
N.V.D.	5.68	5.56
M.H.D.	2.87	4.89
E.V.D.	20,25	21.98
E.H.D.	14,34	18.71
E.S.	20,30	23.65
	TARGET NO. 2 - 0935 HOURS	
M.R.	9.37	8.86
M.V.D.	8.03	6.32
H.H.D.	4.10	4.54
E.V.D.	37.32	26.78
E.H.D.	22,54	18.97
E.S.	40.04	28.70
	TARGET MO. 3 - 0940 HOURS	
M.R.	8,38	10.72
H.V.D.	3.96	9.07
M.H.D.	4.91 ·	4.06
E.V.D.	34.74	38.80
E.H.D.	20.91	21.44
E.S.	36.80	40.00
	20 8 FF T T T T T T T T T T T T T T T T T	
United States	111 - 9-5	
		1



		AL30, SPOTTING, T103 OT NO. 2	CAL280, OBS. LOT 17A
M.R.	nate s	14.46	10.87
M.V.D.		4.62	6.92
M.H.D.		8.18	6.42
E.V.D.		36.68	25.93
E.H.D.		37.43	23.04
E.S.		37.60	26.90
TA	RGET NO. 5 -	1000 HOURS	
M.R.		12.02	9.05
H.V.D.		7.56	6.74
M.H.D.		7.71	5.25
E.V.D.		37.93	24.90
E.H.D.		29.34	18.48
E.S.		38.15	24.95







DATE: 18 April 1950 TEP: 70°F DENSITY: 1.008 WEND VELCCITY: 5 mph

DIRECTION FIRE; SSE

PREVIOUS ROUNDS: Cal. .30 Weapon - 243
Cal. .280 Weapon - 270

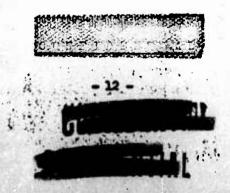
TARGET NO. 1 - 0845 HOURS

	CTG, BALL, CAL30 LOT FA-X30-1290	CTG, S.A. BALL, CAL250 LOT NO. 12A
M.Y.D. M.Y.D.	4.05 2.88 2.26	4.93 3.56 3.31
E.V.D. E.H.D. E.S.	12.73 9.63 13.40	12.97 10.03 13.03
	TARGET NO. 2 - 0850 HOURS	
M.R. H.V.D. M.H.D. E.V.D. E.H.D. E.S.	3.87 2.82 2.33 9.19 9.93 13.04	8.68 3.82 2.98 25.52 10.64 25.73
	TARGET NO. 3 - 0855 HCURS	*
M.R. M.V.D. M.H.D. E.V.D. E.H.D. E.S.	3.69 1.66 2.79 9.20 8.93 9.93	3.83 2.14 2.75 7.14 14.50 15.40
	MORPH TRANSPIR	
	- 116	AL 65



TARGET NO. 4 - 0900 HOURS

	CTG, BALL, CAL30 LOT FA-X30-1290	CTG, S.A. BALL, CAL28: LOT NO. 12A
M.R.	4.41	6.89
M.V.D.	2.49	3.58
M.H.D.	2.82	5.03
E.V.D.	8.77	18.78
E.H.D.	10.52	19.04
E.S.	12.48	26.80
9	TARGET NO. 5 - 0905 HOURS	·
W.R.	3.14	7.24
M.V.D.	1.67	4.64
M.H.D.	2.47	4.65
E.V.D.	7.85	21.94
E.H.D.	8.97	17.68
E.S.	11.37	24.18





APPENDIX E



DATE: 18 April 1950

TEP: 72°F

DENSITY: 1.008

WIND VELOCITY: 7 mph

WIND DIRECTION: S

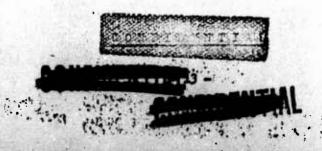
DIRECTION FIRE: SSE

PREVIOUS ROUNDS - 383 WEAPON NO. 450/2

ALBUNITION: CARTRIDGE, S.A., BALL, CAL. .280

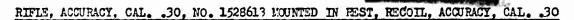
LOT NO. 21A (140-GRAIN LEAD CORE BALL)

	TARGET 1	TARGET 2	TARGET 3	TARGET 4	TARGET 5	AVERAGE
M.R.	8.01	7.02	6.61	7.23	5.65	6.90
M.V.D.	5.80	4.30	4.72	3.89	3.85	4.51
M.H.D.	3.32	4.19	3.77	5.15	3.53	3.99
E.V.D.	27.15	18.70	22.03	18.46	13.48	19.96
E.H.D.	16,12	17.90	12,20	21,12	14.98	16.46
E.S.	29,20	19.00	22.03	21,25	16.45	21.59





APPENDIX B



AMD

CALLEER .280 MANN BARREL NO. 450/3 FITTED TO A P-17 RECEIVER (ENFIELD ISL ACTION NO. 894347

WEAPON SUPPORTED BY VEE SLIDE NO. 101

DATE: 24 February 1950

TEMP: 44°F

WIND VELOCITY: 8 mph

DENSITY: 1.049

PREVIOUS ROUNDS: Cal. .30 Weapon - 23

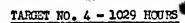
Cal. .280 Weapon - 44

TARGET NO. 1 -1006 HOURS

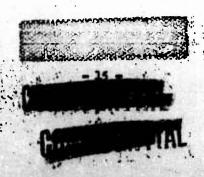
	CAL30, BALL, T104 LOT FA-X30-1358	CAL. 280, BALL, LOT 19A
M.R.	4.58	7.41
Π'A'D,	4.20	5.43 2.47
M'H'D.	2.43	3.67 . 29.00
E.V.D.	14.41 10.12	14.72
E.H.D. E.S.	15.95	29,25
_,0,	-7477	
	TARGET NO. 2 -1015 HOURS	
M.R.	. 6.02	8,26
M.V.D.	3.96	7.07
M.H.D.	4.20	3,26
E.V.D.	12,20	19,27
E.H.D.	13.56	18.48
E.S.	18,20	21.50
	TARGET NO. 3 - 1020 HOURS	
M.R.	4.59	8.07
M.V.D.	2.76	4.45
M.H.D.	3.03	5.90
E.V.D.	8.88	19.74
E.H.D.	13.43	24,25
E.S.	14.40	30.55
	The state of the s	

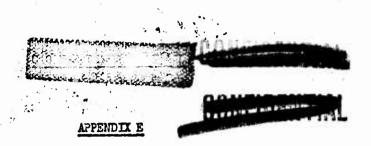






	CAL30 BALL, T104 LOT FA-X30-1358	CAL280 BALL, LOT 19A
H.P.D.	4.67 3.55	6.98 3.54
M.H.D.	2.60	4,68
E.V.D.	17.35	16,55
E.H.D.	9.72	26,60
E.S.	18.50	26,65
	TARGET NO. 5 - 1038 HOURS	44,07
M.R.	7.05	10.68
M.V.D.	3.71	6.85
M.H.D.	4.56	7. 31
E.V.D.	15,33	20,13
E.H.D.	22,00	27,85
E.S.	22,80	31,30





DATE: 27 February 1950

WIND VELOCITY: 3 mph

PREVIOUS ROUNDS: Cal. .30 Weapon - 75
Cal. .280 Weapon - 128

TEMP: 23°F

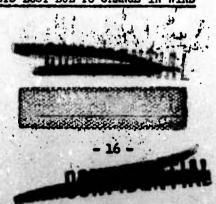
DENSITY: 1.105

TARGET NO. 1 - 0933 HOURS

	CAL30 AP, T93 LOT FA-X30-1357	CAL. 280 AP LOT 24A
N.R.	7.67	13.64
M.V.D.	4.18	9.95
M.H.D.	5.53	3.74
E.V.D.	18.45	41.07
E.H.D.	19.47	37.25
E.S.	21.40	44.15

TARGET NO. 2 - 0941

TARGETS LOST DUE TO CHANGE IN WIND





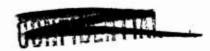
TARGET NO. 3 - 1000 HOURS

M.R. 7.26 15.75 M.V.D. 3.77 12.18 M.H.D. 5.14 8.80 E.V.D. 18.52 38.20 E.H.D. 22.90 34.58 E.S. 24.97 46.75 TARGET NO. 4 - 1006 HOURS M.R. 7.36 10.73 N.V.D. 5.41 6.69 M.H.D. 4.06 7.81 E.V.D. 21.31 33.35	
M.H.D. 5.14 8.80 E.V.D. 18.52 38.20 E.H.D. 22.90 34.58 E.S. 24.97 46.75 M.R. 7.36 10.73 N.V.D. 5.41 6.69 M.H.D. 4.06 7.81 E.V.D. 21.31 33.35	
E.V.D. 18.52 38.20 E.H.D. 22.90 34.58 E.S. 24.97 46.75 TARGET NO. 4 - 1006 HOURS M.R. 7.36 10.73 N.V.D. 5.41 6.69 M.H.D. 4.06 7.81 E.V.D. 21.31 33.35	
E.H.D. 22.90 34.58 E.S. 24.97 46.75 TARGET NO. 4 - 1006 HOURS M.R. 7.36 10.73 N.V.D. 5.41 6.69 M.H.D. 4.06 7.81 E.V.D. 21.31 33.35	
E.S. 24.97 46.75 TARGET NO. 4 - 1006 HOURS M.R. 7.36 10.73 N.V.D. 5.41 6.69 M.H.D. 4.06 7.81 E.V.D. 21.31 33.35	
TARGET NO. 4 - 1006 HOURS M.R. 7.36 10.73 N.V.D. 5.41 6.69 M.H.D. 4.06 7.81 E.V.D. 21.31 33.35	
H.R. 7.36 10.73 N.V.D. 5.41 6.69 H.H.D. 4.06 7.81 E.V.D. 21.31 33.35	
N.V.D. 5.41 6.69 N.H.D. 4.06 7.81 E.V.D. 21.31 33.35	
N.V.D. 5.41 6.69 N.H.D. 4.06 7.81 E.V.D. 21.31 33.35	
M.H.D. 4.06 7.81 E.V.D. 21.31 33.35	
E.V.D. 21.31 33.35	
E.H.D. 16.71 36.58	
E.S. 22.50 49.55	
TARGET NO. 5 - 1012 HOURS	
M.R. 4.70 16.28	
M.V.D. 2.98 14.01	
N.H.D. 2.92 5.65	
E.V.D. 14.09 57.34	
E.H.D 9.27 29.24	
E.S. 14.72 60.50	









TARGET NO. 6 - 1026 HOURS

	CAL30, AP, T93 LOT FA-X30-1357	CAL280, AP LOT 24A
M.R. M.V.D W.H.D E.V.D E.H.D. E.S.	3.51 2.75 1.62 11.11 6.89 11.40	10.21 6.94 6.31 24.90 24.32 29.34
2	PARGET NO. 7 - 1047 HOURS	
M.R. M.V.D. M.H.D. E.V.D. E.H.D. E.S.	5.63 3.79 2.88 13.63 11.48	9.86 5.33 6.77 19.99 27.38 31.25





The following two targets were fired directly after the above Cal. .280 AP accuracy firing. These targets were fired to investigate the possibility of a fault in the mount, wee slide, or barrel used in the Cal. .280 accuracy firing. A 130-grain lead core ball round was fired.

DATE: 27 February 1950

TEMP: 260 F

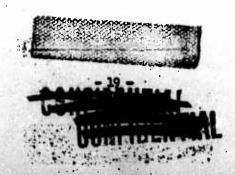
WIND VELOCITY - 8 mph

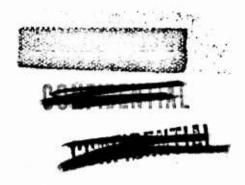
DENSITY: 1.097

PREVIOUS ROUNDS: Barrel 450/3 - 223

AMBUNITION: Cartridge, S.A., Ball, Cal. .280, Lot No. 12A

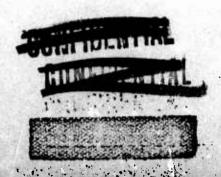
	TARGET NO. 1 - 1100 HOURS		TARGET NO. 2 - 1106 HOURS
M.R. H.V.D.	5.43 3.81		6 . 97 5 . 29
N.H.D	3.42 -	•	4.14
E.W.D.	17.50 16.00		20,33 16,82
E.S.	22.80		24.75





Complete Velocity Data for Caliber .30 and Caliber .280 Ammunition at +70°F, -65°F and +165°F

(28 sheets)



VELOCITY TEST

Date: 23 February 1950 Time Started: 1125 Time Finished: 1200

Universal Receiver No.: 197 Barrel No.: R-12 - The vious Rounds: 20

Armanition Temperature: 70°F Pange Temperature: 39°F . Density: 1.038

Chronograph Type: Counter Initiator Type: Lumiline

Test Assumition: Cartridge, Ball, Caliber .30, TlCl, Lot FAM,0-1358

ROUND NO.	•	INSTRUCTAL VELOCITY AT 781,	fps	PRESSURE, psi
1		2625		
2		2765		
3		2793		
L L		2793 2789		
5		Lost		
6		2803		
1 2 3 1 5 6 7 8 9 10 11 12 13 14 15 16 17		2761		
g g		27.55		
0		2759		
70		2179		
10		2737		
11		2792		
75		2796		
15		Lost		
14		Lost		
15		2818		
-16		2756		
17		Lost		
18		2759		
19		2776		
20		2753		
21		2758		
22		2770		
23		2728		
<i>3</i> .		Lost		
24				
20		2786		
20		Lost		
19 20 21 22 23 24 25 26 27 28		2772 2755		a construction
26 /		2755		
29		2767		

VELOCITY TEST

Date: 23 February 1950 Time Started: 125

Universal Receiver No.: 197 Barrel No.: R-12 Previous Rounds: 49

Ammunition Temperature: +70°F Range Temperature: +40°F Density: 1.038

Chronograph Type: Counter Initiator Type: Lumiline

Test Ammition: Cartridge, AP, Caliber .30, T93, Lot No. FAX30-1357

POUND NO.	INSTRUMENTAL VELOCITY A	r 78', fps	FRESSURE, psi
1 2 3 4	2839 2838 2839 2851 2812		
1 2 3 4 5 6 7 8 9	2862 2851 2056 - 2825 2782		
10 11 12 13 14 15 16	2801 2322 2836 Lost		
17 18	2814 2833 2830 Lost 2804		
19 20 21 22 23 24 25 26 27	2795 Lost 2770 Lost Lost		
25 26 27	Lost Lost 2828	and the	
	The state of the s		

VELOCITY TEST

Date: 2 March 1950 Time Started: 1517

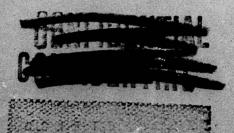
Universal Receiver No.: 197 Barrel No.: Previous Rounds: 105

Ammunition Tomperature: 70°F Pange Temperature: 28°F Density: 1.101

Chronograph Type: Counter Initiator Type: Lumiline

Test Ammition: Cartridge, API, Caliber .30, 7101, Lot No. FAX30-1356.

ROUND NO.	INSTRUMENTAL VELOCITY AT 78', fps	PRESSURE, psi
2-15	Warmer	
2	Warmer	
3	Warmer	
4	Warrer	
5	harmer	
6	271.7	
7	2716	
s s	2764	
9	2729	
1 2 3 4 5 6 7 8 9	2769	
11	2743	
12	2752	
13	2717	
1/4	2725	
15	2779	
12 13 14 15	2720	
17	2737	
18	2755	
19	2755	
20	2664	
21	Lost .	
29	2753	
23	2725	
22 23 24 ·	2737	
25	2719	All the second s
26	• 2775	
	317	



APPENDIX F VELCCITY TEST

Date: 2 larch 1950

" Time Started: 1450

Universal Receiver No.: 197

Barrel No.:

Previous Rounds: 79

Amunition Temperature: 70°F Pange Temperature: 29°F

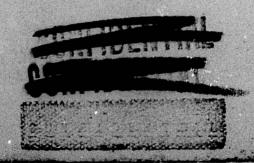
Density: 1.101

Chronograph Type: Counter

Initiator Type: Lumiline

Test Amemition: Cartridge, Tracer, Caliber .30, T102, Lot No. FAX30-1559

ROUND NO. INSTERMENTAL VELOCITY AT 781, fps PRESSURE, psi warmer Warmer Larmer Warmer 2672 2662 2633 10 2014 2573 2604 2657 15 2671 16 2627 17 2623 13 2600 19 2608 20 2588 21 2671 22 Lost 23 2595 2627 2/1 2615 25 26 2625



20日の日本の日本の日本の日本の日本の日本の日本の

VELOCITY TEST

Date: 9 March 1950 Time Started: 1005

Universal Receiver No.: 197

Barrel No.

Previous Rounds: 253

ished: 1047

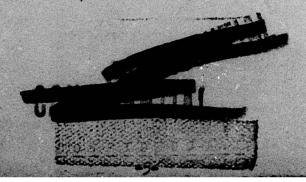
Ammunition Temperature: 70°F .Fange Temperature:

32°F Density:

Corporate Initiator Type: Lumiline

Test Amenition: Cartridge, Spotting, Caliber .30, T103, Lot No. 2.

PRESSURE, psi INSTRUMENTAL VELOCITY AT 78', fps POUND TIO. 2694 21:



VELOCITY TEST

Date: 7 March 1950 Time Sturbed: 1245

Universal Receiver No.: 197 Barrel No.: 12

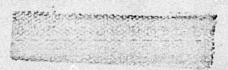
Previous Rounds: 153

Ammittion Temporature: -65°F Range Temperature: 39°F Density: 1.068

Chronograph Type: Counter Initiator Type: Lumiline

Dest Arramition: Cartridge, Ball, Caliber .30, T104, Lot FA130-1358.

ROUND NO.	INSTRUMENTAL VELOCITY AT 78', fps	PRESSURE, psi
123450000	2528 2621 2587 2525 2623	
7 8 9 10 11 12	2567 2525 2623 2610 2632 2573 2563 2548 2623 2623	
13 14 15 16 17 18	2534 2563 2616 2542 2534 2630	
19 20 21 22 23 24 25	2632 2639 2623 · · · · · · · · · · · · · · · · · · ·	
	•)41	



AFFINDIX F

Date: 7 March 1950 Time Started: 1307

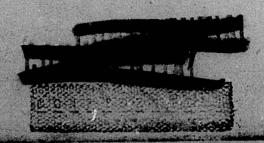
Universal Receiver No.: 197 Barrel No.: N-12 11 Previous Rounds: 178

Ammunition Temperature: -65°F Range Temperature: 39°F Density: 1.063

Chronograph Type: Counter Initiator Type: Lumiline

Test Ammunition: Cartridge, AP, Caliber .30, Lot FAX30-1357.

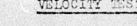
POUND NO.	INSTRUMENT	L VELOCITY AT 7	81, fps	PRESSURE, psi
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25		2508 2636 2623 2611 2580 2651 2612 2625 2655 2601 2580 2647 2632 2538 2538 2593 2593 2597 2616 2607 2621 2622 2593 2587 2658 2505		







VELOCITY TEST





Date: 8 Murch 1950 Time Started: 1245 Time Finished: 1305

Universal Receiver No.: 197 Parrel No.: R-12 Previous Rounds: 228

Armunition Temperature: -65°F Range Temperature: 54°F Density: 1.010

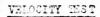
Chronograph Type: Counter Initiator Type: Lumiline

Test Ammition: Cartridge, API, Caliber .30, T101, Lot FAX30-1356.

ROUND NO.	INSTRUMENTAL VELOCITY AT 78°, fps	PEESSURE, psi
1 2 3 4 5 6 7	2580 2614 2650 2587 2618 2612	
6 7	2568	
8 9	2616 2650	
10 11 12 13 14 15 16 17 18	2596 2569 	
13 14	2567 2601	
15 16	2569 2637 2660	
17 18	2596	
19 20 21	2575 2568 2563	₹
22	2584 2626 2554	
23 21 ₄ 25	2554 262 3	







Time Started: 1115 Time Finished: 1135

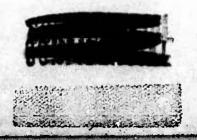
Universal Receiver Ro.: 197 Barrel No.: F-12 Frevious Rounds: 203

a munition longerature, -65°F Range Temperature: 53°F Density: 1.032

Chronograph Type: Counter . Initiator Type: Limiline

That Amenition: Carwridge, Tracer, Caliber .50, T102, Lot FAK50-1559

neuro no.	INSTRUENTAL VELOUITY AT 78:, Tps	PRESSULE, Dai
193450	2013 2613 2616 1000 2560 2560 2560 2560 2560	
2 10 11 12 15 15	2520 2560 2520 2531- 2507 2623 2530	
17 18 19 20 21	2585 2545 2530 2531	
22 25 24 25	2555 2511 2549 2535 2564	





VELOCITY TEST

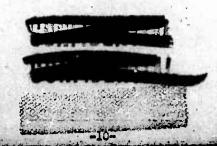
late: 9 con 1990 Time Started: 1455 Time Finished: 1510

Universal Ferriver No.: 197 Farrel No.: R-12 Frevious Founds: 2/8

accumition a construct -65°F Range Temperature: 35°F Density: 1.083

That Ammunition: Cartridge, Spother, Caliber .50, Lot No. 2

110,	TIGHTHIAL WILDOW AT TO:, Fro	PIESSURE, thi
1	Lost	
1 2 7 4 5 5 5 7 8 9 0 1 1 2 1 5 1 5 6 7 8 1 9 1 9 1 9 1 9 1 9	Loct	
3	Lost	
Ĩ,	21.01	
5	21:65	
** ***	Los t 2454 2463 2456	
-	○ T2 T	
; a	作ります。 ショウカ	
67	ارت ر بارس	
7	01.00 CT1.	
10	2723 1701 •	
44	2705	
15	2500	
±2	2506	
11	2541	
15	2504	
16	2496	
17	2519	
18	24.95	
19	21.93	
20	2574	
21	250/1	
	2486	
23	2517	
2/1	2/19/1	
22 23 24 25	2523 2479 2528 2506 2506 2504 2496 2519 2495 2495 2495 2495 2486 2517 2494 2588	
	- 2,50	



ASTOCILA JEST

Tata: 15 3-6h 1950 Time Started: 1255 Time Finished: 1307

Telverest Faceiver Fig.

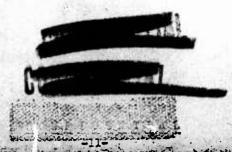
Barrel No.: .-12 Previous Founds: 321

Launition west dancer vis and Temperature: 1.2°F Density: 1.0.8

Clronograpa bye: Courter Initiator Type: Decilina

Test Ammenition: Cartridge, Ball, Caliber .30, TlO4, Lot FAX,0-1355.

F.: D.::0.	INSTRUMERTAL VELOCITY AT 701, for	Franke, pai
1 2 2	261:6 2038 2008	
5	25.7 2867	
	2654 2654 2654	
9 10 11	2878 2205 2847 2867 2853 2854 2634 2649 2852	
12 13 1.1	2870 2852 2831 2839	
15 16	2839 2 631 2622	
16 19	2822 2838	
20 21 22	2823 2823 2823 2850 2792 2822	
1 2 5 4 5 7 8 9 10 11 12 15 16 17 16 19 20 21 22 25 24 25	2792 2822 2823	
	1,000	





VELOUITY TEST

Pate: 15 Arca 1950 Pine Started: 1330 Time Finished: 1335

Universal Inceiver 1 4 197

Parral No.: R-12 Fravious Rounds: 316

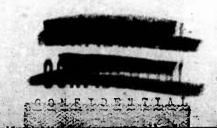
Camporature: 12°F Density: 1.1.3

- ranograja I/70: Combor

Initiator Typo: Inmiliao

Test Ammunicion: Cartridge, AF, Milber . 10, Dd, Lot 1110-1557.

יסובום אף,	THE OWN THAT VELOCITY AT THE CO.	PIESSURE, 121
1 1 3 4 5	2052 2356 2435 2447 2432	
5 7 8 9	$\mathcal{Z} \cap \mathcal{A}$	
	2841 2617 2857 2847 2841 2850 2814 2055 2850	
11 12 13 14 15 16	281h 2057 2830 2833	
17 18 19 20	2.833 2.814 2.8147	
20 21 22 23 24 25	2 87.5 28.44 28.47 20.59 283.4 2823 2814 2833	
ર્ટો. 25	200. 28 07	





Date: El Arch 1990 Mica Started: 1155

Time Finished: 1155

University Seattlest 0.1177 arrel No.: 1-12 Previous Rounds: 306

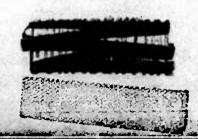
Las a Comporature: LO°F Density: 1.079

A rane maja Agus - Nomber

Initiator Type: Lumiline

Test haramitism: Lartridge, API, Caliber .;0, 1101, Lot FaX50-1356.

IC 7.0 : C.	mentional was the Affr, fre	PRESSURE, 181
123456	2523 2323 2531 2337 2332	
56	2557 2677 2677 2677	
	2012 2023 2873 2872	·
9 10 11 12 13 14 15 16 17	2651 2ල්,ර 2847	
19	2 859 2 346 . 2069 2860	
20 21 22 25	2630 2854 2839 2852	
22 25 . h 25	2852 2811 2811	





VELOCITY TIST



Dato: 24 March 1950

Ton Started: 1112

Time Finished: 1130

Universal exceiver Sc. :

Terral No.: R-12 Previous Rounds: 571

committee apparature: +105°F Reage Temperature: 40°F Bensity: 1.079

Cronograph Type: Counter

Initiator Type: Aumiline

Test Ammittion: Cartridge, Frager, Galiber .50, T102, Lot FAK30-1359.

PCHID MO.	IN THATHAL VELOCITY AS	1781, frs	FRESSURE, psi
1 2 5 4 5 6 7 6 9 10 11 12 15 14 15 16 17 18 19 20 21 22 23 24 25	2697 2719 2772 2730 2728 2735 2713 2726 2749 2723 2750 2751 2756 2740 2743 2758 2719 2703 2719 2703 2710 2714 2710		
-/			







VELOCITY TEST

Pate: 23 Figure 200 Started: 0931 Time Finished: 1000

Universal heart for the

Barrel Me.: 149-5 Previous Counds: 48

Amministion Appendeurs: +70°F Ponge Compensature: 59°F Density: 1.033

Chronograph Tope: Committee Initiator Type: Lumiline

Tast Asymmittion: Curtridge, SA, Jall, Caribor. 200, Lit So. 194.

u b no.	T13 T121	FILL VOLCOUR AT 701, for	PINSSURE, mai
1 27		2057 2511: 2510 2057	
1 2 5 4 5 6 6 9 9 9 10	= .	Lost 254. • 2525 2575 2501	
		2253 Lost 2274 2253	
11 12 13 14 15 16 17 18 19		Lost 2255 Lost 2261 2217	
19 20 21 22		2255 2217 Lost 2284	
23. 21. 25 26		2252 2256 2297 L ost	
27 28 29		Lost 2265	
30 Pounds 1-3 - 1	Warners.	Uliffia	



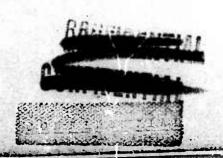
Date: 23 Johnnary 1950 Time Started: 1030 - Time Finished: 1055

Universal .negiver No.: Parrel No.: 149-5 Previous Rounds: 85

emmittion Lagueratures =70°? Density: 1.070

Test Arramition: Cartridge, SA, AF, Caliber .280, Lot No. 21A.

1.01.1.10 3.0°	1	ECONOMICAL VILLOUIT AT 701, Fra	FICOSUME, Pai
12 52556 76 90 12 54 156 178 19	·	2195 2193 2204 2217 2227 2252 2212 2150 2174 2170 2217 2256 2235 2219 2227 2192 2170 2186 2179 2222	
20			





VELOCITY TIST

Pute: 8 10 mg 1950 Time Started: 1038 Time Finished: 1100

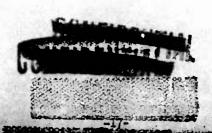
Universal incliner No.: 100 Previous Founds: 108

whitien is parature: 10 r - Lingo Temperature: 55°F - Density: 1.052

Circus graph Upo: Counter Initiator Type: Lumilino

That dominition: Cartridge, AFT, Caliber .200, Lot 23A.

F1 110 110.	INSTRUCTION VILLOCITY AT 701, fre	MIRSSUAR, isi
1	- Lost	
2	2350	
1 2 2	2251	
1	2277	
5	2235	
5	2251	
7	2250	
ė	2232	
8 10 11 12 13 14 15 15	2239 2239 2195	
10	2195	
11	2203	
10	2211	
17	2180	
nl.	2190	
15	2105	
16	2178	
17 18	2177	
18	2189	
19	2159	
20	2158	
21	2185	
22	2208	
25	2179	
CIL	0167	
22 25 C4 25	2171	
	44 J 4	





VELOCITY TEST

Pate: 27 Jarra 1950 Time Started: 0918 Time Finished: 0938

Mairureal Tocalvar No.: Sarrel No.: 119-5 Previous Rounds: 111

and the following the state of the state of

i de lamperature: 44,°F Density: 1,047

Trangram Lyne (conte-

Liviator Tope: Inmiline

Dat armitim: Cartridge, SA, Tracer, Caliber .280, Let 521.

	I.3 C CUTL W LOOTTY AT 701, the	FERSUNE, poi
100	2165	
,	22.0	
3	2165 2209 2256	
N.	· 27 <u>1</u>	
2 2 2 T C 2 2 T C 2 2 T C 2 2 T C 2 2 T C	1255	
** **	225 <u>5</u> 225 <u>1</u>	
149	Constant South	
	2151 2213	
C	Grant C	
30	4245)	
, <u>1</u> Q	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	
44	4424	•
	223	
22	<u>4519</u>	
پسته م	2-27	
1.7	2250	
16	2293	
17	2170	
18	. 2230	
19	2225	
20	2232	
21	2266	
22	2228 .	
23	· 221/4	
10 10 14 15 17 18 19 21 22 21 22 24 25	2215 2247 2254 2 2 5 2319 2257 2 250 2293 2170 2 230 2 235 2 232 2 232 2 266 2 228 2 244 2 293	
25	220 1	



APPENDIM F

VELOCITY TEST

Time Started: 0909 Time Fluished: 0915

in the late iver He.:

Barrel No.: 149-5 Previous Rounds: 203

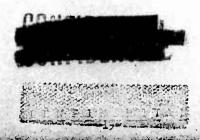
Prature: F177 Onsity: 1.73

Little Counter

Enitlater Type: Lumiline

The immediance Commission (13), Caliber .250, Let 174.

ET. THO.	ESTERIANDA VELOCIEY AC 781, Sto	PISSUE, mai
15 NO.	2517 2570 2566 2591 2557 2370 2370 2370 2374 2362 2374 251 2561 2563 2333	2.23SUEi
15 17 18 19 20 21 22 23 24	23 ¹ 4 2322 2355 2345 2319 2350 2317 2290 2355 2336 2267	







Sates 9 March 1950 Time Started: 1047 Time Finished: 1115

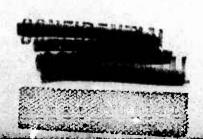
Correl No.: 49-5 Frevious Rounds: 133

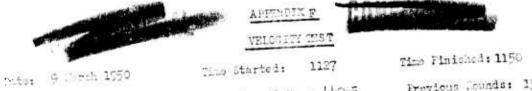
condition a correture: -cjfF | fange Temperature: 32°F | Bonsity: 1.03

Countraja amo: Countra Initiator Typo: Intilino

this ammittion: Cartrille, Eall, Caliber .200, Lot 194.

1	THE MERCHAN L VELOCITY AT 701, for	FIEGSUPE, 1:1
1	2178	
2	2233	
3	2200	
<u>[,</u>	2253	
5	2206	
4	2218	
7	2197	
â		
1 2 3 4 5 6 7 8 9 10	2198	
10	2157	
11	2161	•
12	2200	
12 13 14 15 16	2110	
11:	2158	
1 5	21/17	
16	2175	
27	2157	
18	. 2193	
19	2146	
20	2103	
21	2142	
22	2156 .	
23 2 <u>1:</u> 25	2167	
51:	2165	
25	211,5	





VELOCITY TEST

thorsal Receiver No.:

Carrel Mc.: 449-5 Previous Counds: 158

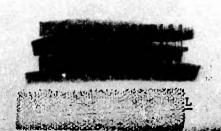
.- mailion agricumbines. -95°F | Denie Panjarature: 32°F | Deniety: 1.038

Total State Spot Country

Initiator Type: Lumiline

ist amerities: Carreldge, AP, Caliber .250, Lot 254.

	merymorthal Valority AT 75', fas	FIDSSUME, psi
1111 110	And the second of the second o	
1 2 2 1 5 6 7 6 9 10 11 12 15 14 15 16 17 16	2020 2071 2109 2061 2047 2063 2063 2074 2074 2045 2063 2101 2037 2064	
15 16 17	2016 2070 2070	
18 19 20 ,	2101 2072 2059	
19 20 21 22 23 24 25	2079 2081 2094 2048	
25		





APPENDIX P VELOCITY TEST



Nate: 9 March 1950 Time Started: 1251 Time Finished: 1301

Mivercal Faceiver No.:

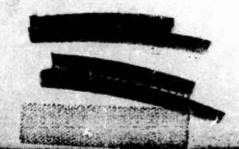
Farrel No.: 449-5 Previous Rounds: 183

Amultion Appreture: -15°F | Iange Temperature: 32°F | Density: 1.008

Unrecentage Type: Onte tor Initiator Type: Intiline

Cost arramition: Cartridge, AFI, Caliber ,280, Lot 254,

	DETERMINANT VILOCITY AT 781, fra	FIESSULE, 131
+ 2 5 £ 5 6 7 0	. 2029 2087 2105 2111 2085 2097	
9 20 11 12 13 15 16	2009 2017 2034 2033 2017 1991 2037 2006	
16 17 18 19 20 21 22 25 21 25	2000 1990 1976 2036 1970 1994 2006 200	•
25	2008	





Time Finished: 1132

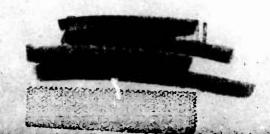
Carrel No.: 119-5 Provious Pounds: 155

there is the form the companion of the

The Control Control Control Cype: Limiting

Eleb Commission: Cherrolin, St., Chicar, Califor .2.0, Loc No. 32A.

Apple control and a second	THOUTHIELD STILLOTTE IT Cot, is	FINSURE si
ng .	2075	
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3	22.75	
Ĭ.	2317	
	2350	
1 2 2 2 4 5 6	21.05	
7	. 5373	
7 3 9 10	222	
a	2135	
วก์	2109	
11	2130	
٠-٠)	2130 2106	
100	2008	
11.	2070	
15	= 2094 2070 2094	
1/4	2090	
17	2098	
- 6	2120	
10	2109	
20	2030	
20	2022	
53	2106	
24	2088	
11 12 13 14 15 16 19 20 21 22 25	2117	
0.0	2122	
دع	5155	



APPENDIX F

VETCOIM U.S.

: to: 10 10 10 1950

Time Started: 11'0 Time Finished: 1200

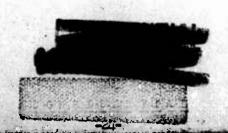
Universit I : hver Co.: Earrol No.: 49-5 Provious Rounds: 491

is initially a weburne -of T Tallyo Tampo tours: +55°P Dennity: -557

Chargespa Mago: Counter Teleticity Cype: Lordino

This Lammittens Cortains, St, L.S. Wilber .200, Lot 17 .

	RECYVIERDIL VILLUIT AT THE fro	and the state of t		
1 2 3 5 6 7 9 10 11	2163 2165 2217 2255 2175 2256 2267 2267 2169 2162 2171			
12 13 14 15 16 17 18 19 20	2171 2177 2179 2185 2208 2147 2213 2203 2193			





APPENDIX F VELOCITY TEST

Dato: 15 March 1990 Time Started: 1112 Time Finished: 1125

Columnal Ressiver No.: Barrel No.: 1/19-5 Previous Rounds: 291

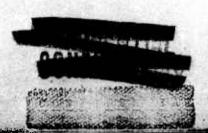
Traduction Thrombours: ⇒155°F For a Temperature: 40°F Bonoity: 1.055

Transpark Type: deumiter

Teitiator Type: Lumillac

That Accumition: Cartridge, St, Ball, Cliber . USO, Lot 19A.

Terrin .	INCIDENTAL VALUE OF AT TOTAL YES	FTTCSURE. : 31
Sureces opening property visites		
1	a 1:: 5 2:: 11	
2	2.1.1	
3	Lacti	
L:	27.7	
5	27.7 27.7 27.7	
6	And the state of t	
7	<i>6</i>),)	
å	4.	
9	23.6 •	
16	52.33	
11	25.60	
1 2 3 5 6 7 8 9 10 11 12 15 16 17 18 19	25.0 25.0 25.0 25.0 25.6 25.6 25.5	
13	25.5	
11/2	2/5	
15	2220	
16	モ リファ	
17	28.25	
1 N	2)=)	
10	9212	
73	ovel.	
20	6774 6776	
21	6700	
22 07	2)29	
<u>دع</u>	2359 2373 2325 2374 2375 2376 2329 2350 2342	
20 21 22 23 21: 25	6 212	
47	2515	





VELOCITY TUST

Fine Started: 1140

Time Finished: 1155

Universal Possiver To.:

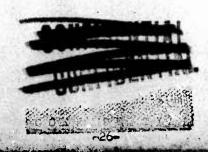
Earrel No.: 119-5 Freelous Rounds: 121

s beautiful approximations: +15-°P Range Remperature: 40°F Pennity: 1.055

Chronegraph Type Compor . Initiator Type: Exmiling

That we make the control of the children . 200, Lot No. 244,

		And the second s	. L	Yara alama	ATT OF THE STREET		733.010. 151
1				2321			
1. 2.3456 7.8 90 11. 12. 13. 14. 15. 16				2321 2325 2362 2360 2303	d- 1/4 1 phys.		
) 1.			4	22.11			
<i>4</i> 5				2305			
7,				2315			•
7			**				
3				<u> </u>		~	
ģ				22:8			
1ó	4			22,8 2883	4		softs "-
11	*			2307 2285			
12				2285			. ~
13				2265			
1/,			Ex.	2235	PS W - He F		
15				2 289			
16				5501			
17				2291 2500 2507			
18				2507			
19				2511			
20				2293 2295			
22				2277			190
23				2538 2295 2307			
21,				2307			
18 19 20 21 22 23 24 25				2291			



APPENDIX P

VELOCITY TIST

Pate: 15 March 1950 Time Started: 1512 Time Finished: 1340

Universal Loceiver No.: Barrel No.: 149-5 Previous Rounds: 381

Amunitian Imperature: 415, 7 1 Range lesiperature: 36°F Density: 1.679

Chronograph Type: Counter Initiator Type: Émilina

Past Americaion: Cartridge, SA, API, Caliber 1830, Ict No. 254.

	INSTRUCTION WELCOMEN AT 75%, Pres	FIESCUSE, roi
1 2 3	2271 2236 2339 2373	P.H
5 6 7 8	23.05 23.00 Loss	
9 10 11 12	2307 2355 2349 2547 2523 2346 2256 2270 2269	
13 14 15 16	2523 2545 2316 2316	
1 2 3 4 5 6 7 6 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26	2270 2209 2294 2289	
21 22 23	2289 2296 2295 221d 2263	
25 26	2 251 2 272	



Date: 27 March 1990

Time Started: 1100

Time Finished: 1120

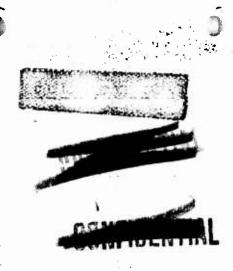
Universal Festiver No.: Berrel No.: 149-5 Frevious Rounds: 141

econstition Comparatures +169°F Imaga Temperature: 426°F Density: 1.017

Cureactraph Dyes Counter Dailine, Dyes Lumilia

Instructuation: Artridge, SA, Tracer, Maiber .280, Let 324.

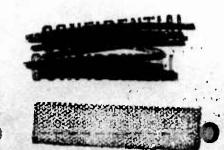
1.11D 10.	INTERPRETATION VI	1.35072, 771	
1. 2. 2. 1. 5. 6. 7. 6. 9.) (2) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	Lost 2565 2573 275 2509 2571 2503	
		2505 2507 2503 2503 2502 2575 2399 2372 2573 2573 2573	
11 12 15 14 15 16 17 13 19 20 21 22 23 24 25	2 2 2 2 2 2 2 2	2370 2370 2380 2344 2364 2350 2360 2360	



APPENDIX G

Complete Pressure Data for Caliber .30 and Caliber .280 Ammunition at +70°F, -65°F and +165°F

(23 sheets)



PRESSUIE EST

Tato:

Time Started: 1330 Time Finished: 1420

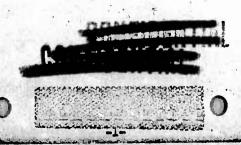
Universal Baceiver do.: 197 Earrel No.: 6-30 Freedoms Hounds: 0

Transition Lemberature: 70°F Fange Temperature: 32°F Bonsity: 1.0%

Chronograph Ame: Compar Indicates the fine

That Assemblian: . ravides, Eall, Olliber .50, Tich, Lot FARGO-1:58

	DESTRUCTE L MARGOLIN AT 701, Con	PIESSUME, rai
7	271.7	51100
2	2732	51700
7 2 3 H 2 5 P	2747	520cc
<u> 1.</u>	2746	5 1 500
-9	271	538CJ
5	2761	5 1 500
7	2,143	52304
8	3 <mark>7</mark> 52	923us 530s)
7 8 9.	2770	55nao
-10	271:0	51700
11	27 ¹ ₄ 0	51200
12	2790	55100
13	2741	51 500
13 24 15	27111	51 600
15	2761	500 00
16	2741	50000
17	276 1	51100
18	. 2737	517 00
19	2769	51 600
20	2743	511 00
21	2769	52100
22	2765	53400
23	2750	51600





PRESSURE/VELOCITY FIRING

Cartridge, AP, Caliber .30, T93, Lot F Universal Receiver No. 197

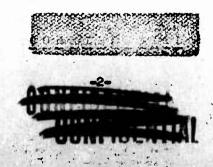
Barrel No. G-30

Previous Rounds: 28

Ammunition Temperature: 70°F

Range Temperature: 32°F Density: 1.084

TIME	RD 1	VELOCITY	PRESSURE	TRE	RD	VELOCITY	PRESSURE
1500	1 2 3 4 5 6 7 8 9 10 11 12	271.7 2822 2773 2781 2786 2762 2765 2781, 2809 2806 2806	47900 56100 51700 54000 51200 47600 47000 53100 53200 53800 53300	1550	13 14 15 16 17 18 19 20 21 22 23	2784 2759 2801 2770 2758 2803 2795 2765 2800 2793 2804	524,00 504,00 52200 46200 514,00 54900 464,00 49200 504,00 464,00
Extr	Average Vaximum Minimum eme Variation	2787 • 1 2811 2758 • 53		Max Min	rage imum imum reme	Variation	512 7 0 54900 47 000 7900



PERSONE TIST

Date: 2 March 1950 Time Started: 1257

Time Finished: 1405

Universal Feddirer No.: 197

.....itica & corature: 70°;

Frevious Founds: 76

dejorature: Density: 1.101

That America Carteline, API, Chilber .50, 1101, Los No. Filipo-1355

1012 5 200	ESTELLULL CLACIT LETT. Pra	Fr.TSSURE. Osi
,		
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Character and a second a second and a second and a second and a second and a second a second and	
<u> </u>	armer.	
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<u> </u>	(A.77), O.	
2	%armer 2638	
5	25.78	50600
Ĩ.	G071	46200
3	4/07	50100
9 10	270 7 2634	51800 49600
10	2634	49600
11	2387	L6200
12	2372	50200
13	2ა9₹	51500
11 12 13 1- 15 16	2597 2572 2593 2597 - 2597	51600
15	2743 2678	51800
16	2578	49800 52200
17	2711	52200
13	2577	501.00
19	2698	49000
19 20	2716	50800
21 22 25 26 25 25	27 07	51500 51400
22	2685	514.00
23	2682	1,8600
211	2701	<u>4</u> 8 600 5 1 400
25	2713	51100
	Section Management	71200
	CONTRACTOR OF THE PARTY OF THE	
	N. W. Lindson	
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	TERVISION OF THE PARTY OF THE P	
		P1 /
		100
		-

AIPENDIX 0

PERSURE 757

Patu: 2 March 1960

ged: 0920

Time Finished: 1000

Universal Lacuiss 1

Earrel No.: 050 Provious Lounds: 51

remaintain is remaiure: 70°F | fance Temperature: 20°F | Density: 1.131

Througgraph Prog: Compter Initiator Type: Limiline

That drawnithers: Cartriles, Tracer, Caliber .30, 1102, Lot No. FAK60-1359

The state of the s	D.5 77.	TRAL VIGOLIV AT 701, Sys	FILESUEZ, pol
1			
<u>1</u> 2		1.222.21	
2		larier	
1		production of the same	
5		-arm er	
6		2551	F0300
·-			40400 4 0 400
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ý,			41400
9 10		2592 2596	41200
10		2000 675)	177.00
11		25 1	<u>1</u> 3700 45600
12		2601	45000
15		2528	41600
11:		2599	L2800
15		2591	45200 40200
16		2505	40200
17		2505 2573	1:21:00
18		54.3g	[바eoo [15]:co
19		2569 2533 2545	59800
20		25/12	42700
		2577	14,600
21		2711	1.2700
22		2583	43700 1,4800
23 의:		258L	1,000
24		2529	42000
<u></u>		2600	45600

PREISURE TEST

Date: 9 March 1950 Time Started: 0830 Time Finished: 0930

Universal consiver No.: 207

Earrel No.: G-30 Provious Rounds: 203

is multiple in personner 7977 /11 (onto Comperature: 30°7 Donsity: 1.638

Chronigraph Type: Counter Initiator Type: Lumiline

Testmition: Cartridge, Spotter, Caliber .30, T103, Lot No. 2

-11) FU.		I.ST	.EL TELCHI AT 78	, ins	FEESSURE, usi
1 2 5 4 5 6 7 5 9 0 11 15 16 17 16	**		2734;		45200
2			Lost		39900
3			10st 2714 232		39900 41500
1:			2:02		あす の11
5			2591		4,1900
5			259 1 2725		1,1600
7			2004		42700
Ú			27:2		42200
9			2004 2732 2711		41500
10			2706		41900 41600 42700 42200 41800 41800
11			2704		42200
12			2706 2704 2704 2706		42200 43000 42200
13			2706		42200
1			2738		43600 43000
15			2691 268↓		43000
15			268↓		lı1 600
17			2737		44,000
13			2737 2631		41,000 1,0500
19			2762		43700 42800
20			270/1		7,5800
21			2734 2674		42700
22 5			2674		38300
23 .			2722		Ĺ1,00 1,1300
21.			2709		1,1800
23 × 21. · 25			2688		42800
1				8.7	





APPENDIX G

SSURE THE

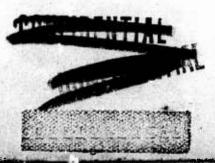
Fine Started: 1350 Time Finished: 1450

Universal Receiver No.: 197 Surrel No.: 9-30 Frevious Mounds: 101

Curenegraph Type: Counter Initiator Type: Lumiline

Stat Lemmission: Cartridge, Ball, Califer .jo, Floh, Lot MAK,0-1558

7-270 MO.	PERTURENTAL VEROUITY AT 701, 2-3	_ PROSSUEE, rsi
1 2	2693 2690	1,6500 1,6600
2 3 4 5	2752 2703	50360 51400
	: 265 6 2637 2603	<u>1</u> 7600 50600 15400
<i>l</i> .⁵ 9	2009 2009 2053 2056	45600 49000 1,7500 4,2300
10 11	2676 264 3 2614	47500
12 13 14 15 16	<u>4539</u>	l₁8000 = l↓1,200
14 15	2575 2529 2527	4,6000 45 100 49400
17 16	259 7 255l ₄ 2515	49400 43 100 424,00
19 20	2558 250 0	43400 48500
2 1 22	5900 5901	47500 46200
22 2 3 2 <u>1</u> 25	2573 2548 2 633	47 500 444,00 4,64,00





APPENDIX G

PEESSURE TES

Tate: 7 March 1950 Time Started: 1500 Time Finished: I605

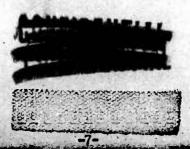
Universal Receiver No.: 197 Barrel No.: 6-30 Previous Rounds: 126

Littaunition Tomperature: -55°F Conge Temperature: 55°F Density: 1.063

Chromograph Type: Counter - Initiator Type: Lumilino

Obst Ammition: Cartridge, AP, Caliber .30, Lat FATSO-1557

10:110	INCIPUINDAL VICCITY AT 701, fps	P1 33UAE, 131
1 2 5 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	2068 4507 2026 2051 2018 2065 2065 2067 2067 2067 2067 20626 2077 20627 2044 2064 2064 20664 20664 2066	51000 14000 50400 50400 50100 48800 14800 14800 14800 149100 149100 149100 149100 149100 149100 149100 149100 149100 149100 149300
21 22 25 24 25 25 26	2595 2595 2636 2643'	45600 44600 50400
20	2043'	50400







APPENDIX C

PRESSURE TEST



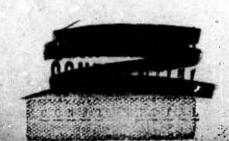
Date: 8 March 1950 Time Started: 1355 Time Finished: 1440

Universal Roseiver No.: 197 Barrel No.: 3-50 Previous Rounds: 152

emmittica Superature: -65°F Page Temperature: 54°F Dencity: 1.010

Dot accomition: Cortridge, Tracer, Caliber .30, T102, Lot FAT30-1359

The state of the s	THE PREVENUAL VELOCITY AT 7	81, fcs	PIESUKE, mai
1 2 3	2525 2506 2431 2521 2509 2446 2445 2445 2444 2494		43000 . 4 0 400
3	<u> </u>		40400 44000 45600 46700 35200 43400 43400 43400 47400
16	2521		45600
5	2509		46700
Ś	2:15		39200
	24,65		454,60
" 2 9	21.25		40400-
9	21.64		43400
10	21.04		115200
11	2504		1:71:00
11 12 13 15 16 17 18	2595		37500 516 00
13	2595 2585 2459 2464 2484 2485 2481 2545 2525	*areasta.	51600
1.	2459		42300 44000 47600
15	2464		71,000
16	21,81,		47600 .
17	21,35		47600
1 3	2481	7	44400
19	2543		74,800
20	2525		43200
21	21:50		45200
22	2500		43300
22 23 24 25	2500 248 1 2452		43200 43300 Щоос
21.	21.52		<i>₩</i> 1200
25	2413		39800





PERSONE TEST

Date: 8 March 1990 Time Started: 1500 Time Finished: 1555

Universal Equations See: 197 Sarrel No.: 0-70 Previous Counis: 177

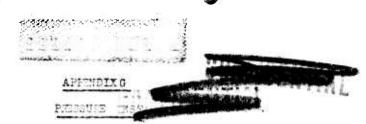
ammittion lengerature: -67° lange lengerature: 54° lensity: 1.010

Caratytaph Type: Counter Initiator Type: Lumiliae

Test Assemition: Cartridge, and, Caliber .50, Thol, Let AMSO-1956

7.3.27	DESTRICTED VELOCITY AT 781.	ins PHESSUFE, bs
1	2701	1,9600
2	270 1 2514	51000
	2740 2740	14,200 1,7 0 00
10.01-0.01	2572	1,7000
Ś	2977	1,9000
7	iost	Iost
3	2)75 2607	45600
9	2607	46200 /
10	2539	<u> 45</u> 500
11	2592 2572	48200
15	2576 2576	- 47000 50 100
12 15 14	2500	14300
15	2558	141800
16	2519	ليا يا 1300
17	2521:	46700
18	2601	Lal:00
19 20	2585	50000 17020
21	252 / 2 569	43000 4680 0
22	2523	46000
23 24 25	2572	1,7400
21	2538	43700
25	2510	L1500
26	2545	CO81777
	The state of the s	
Rounds 1-5 -	Warmers.	





Eate: 9 March 1950 Time Started: 1550

Time Finished: 1420.

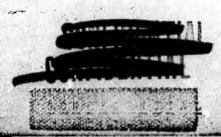
Universal Teceiver No.: 197 Barrel No.: G-30 Frevious Rounds: 228

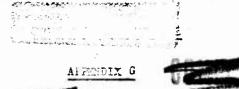
Accomplision Compositive: -65°7 | Dange Tamperature: 35°F | Density: 1.083

Coronograph Type: Counter Initiator Type: Lumiline

fost assimition: Carbridge, Sjoster, Caliber .30, Lot No. 2

ECCID NO.	DISTRUMENTAL VELOCITY AT 78', Sec.	PTESSURE, pai
1 2 3	25 ⁴ .3 2470 2504 2535	38200 38700 37800
4 5 6 7 9 10	2504 2523 2525 2515 2172 2446	57800 59600 59800 40500 19500 36500 36400
11	2571 2500 2501	39000 39900 40000
13 15 16	2557 2491 2515 2525	59200 57200 40300 36800
17 18 19 20 21	2467 2496 2509 2521	38800 38000 41000 40200
22 23 21, 25	21,95 21,85 251,1 21,61 21,90	59200 37400 40200 34000 39300





Date: 15 March 1950

Time Started: 11,02 Time Finished: 11.15

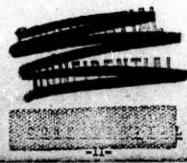
Universal Receiver No.: 197 Barrel No.: 6-30 Frevious Rounds: 253

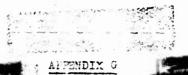
And Temperature: +105°F Bange Temperature: 42°F Density: 1.013

direnograph Type: Counter Initiator Type: Lumiline

Test Accomition: Cartridge, Eall, Caliber .50, TlO., fot FAI30-1558

nouth no.	INSTRUCTION AT 781, 198	FFESSUME, wai
12345678901234567890122345	2623 Lost 2730 Lost 2703 2773 2775 2770 2790 2798 2789 2787 2719 2792 2717 2769 2792 2750 2772 2746 2820 2776	51400 45400 45400 45400 45600 45600 45600 45600 45600 45600 45600 46600 46700 46700 44800 51500 46800
49	2755	464.00





PRES UPE TEST

Date: 13 March 1950 Time Started: 1500 Time Finished: 1550

Universal Federiver No.: 197 Barrel No.: G-30 Previous Founds: 278

Association Lemperature: 1165°F Inngo Temperature: 44°F Density: 1.048

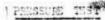
Grenograph Type: Counter Initiator Type: Lumilino

Tost Amemition: Cartridge, AP, Valiber .30, P.9, Lot FAX50-1997

Reulid Mo.	INSTRUMENTAL VELOCITY AT 701, Pps	FIRSSURE, pri
1	2 790	45600
2	275.5	1,7000
3 ·	2006	48100
Ĭ.	2773	5:400
5	2616	48700
6	284.3	1.9800
7	2650	49600
ġ	2100	19000
1 2 5 1 5 6 7 8 9	2805	48100
10	2845	1,3100
11	28/13	50000
	2605	46600
12 13 <u>北</u> 15	2811	48100
Ú.	2853 2853	51100
15	2812	47600
16	2811	47400
17	2807	48100
18 _x	2811	h3500
19	2764	46600
20	2001	47600
. 21	2781	47300
	. 2 804	1,7000
22 2 3 24 25	2820	52000
2/.	2 80/ ₄	1:74:00
25	2607	49000
		49000







ime Started: 1310 · Time Finished: 1350

Universal Reseiver No.: 197

Earrel No.: G-30 Previous Rounds: 303

Armenition Temperature: #165°F Dange Temperature: 42°F Density: 1.054

Chronograph Type: Counter Initiator Type: Lumiline

Test Armenition: Cartridge, API, Caliber .30, 7101, Lot 74.750-1550

MUID NO.	INSTRUMENTAL NELOCITY AT 70:, fbs	PRESSURE, Pri
1 2 3 4 5 6	27ć9 2779	4 7 500 4 7 600
~	2117 2002	50600
7	2775 2773	47000
44	C(1)	4590 0
2	2717 2501	797 0 0
	2001 2001	19000 19000
7	mer en	50000
7 3 9	2761	<u>1,5500</u>
9	2 77 6	48100
10	2772	45000
11	2809	50600
12 15 14 15 16 17 18	2809	5060 0
15	2796	47600
1/4	2782	48000
15	_2811	51800
16	2804	47300
17	2714	45100
18	2795	49800
19	2311	51600
20	2764	1,5200
21	2767	49400
22	2765	48100
23	2765	48700
24	2756	47800
23 24 25	2762	47500
77000	DESCRIPTION OF	



AFFENDING

Date: 14 March 1950 Time Started: 1455 Time Finished: 1555

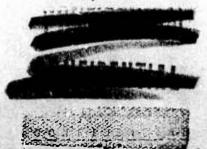
Universal Receiver No.: 179 Barrel No.: c-30 Frevious Rounds: 328

Transition Temperature: 4165°F Page Temperature: 42°F Donsity: 1.008

Chronovraph 1901 Counter hitiator Type: Dufiline

Cost Amemition: Cartridge, Tracer, Coliber.30, TLC2, Lot E.MSO-1359

2/11/20 0.0 .	INC. THE MELL INDICOLDY AT 701, fps	FITSSURE, psi
1	Loct	38 700
127245012890	Lost	40800
Ž	Lost	444500
4	Jest	398 00
5	1-037	59000
6	€687	423 0 0
8	and the same	3,200
8	**************************************	F9200
9	೭೦ು1	40200
10	20514	<i>3</i> 980 0
11 12 15 14 15 16	2474 2690 	40400-
12	2690	42000
13	2677	38 7 00
11/1	2537	<u>4</u> 1200
15	2635	1,0400
16	2670	41100
17 18 19	2675	42500
1 8	. 2550	41700
19	2694	710000
20	2694 2 69 1	41800
21	2637	38 600
22	2678	39600
25	2658	40100
21 22 23 일 1 25	2 662	41600
25	2629	40300
	17.77	
Rounds 1-5 - 1	in more	
Tioums 14) -	Half mol so	





APPENDIX C

PRESSURE TEST

Tate: 24 February 1950 Tim, Started: 14

Plane Linished: 1525

Universal Receiver No.:

Parrel No.: 10:9/6

Frevious Rounds: 11

Ammunition lauperature: 470°F Fange Temperature: 38°F Density: 1.049

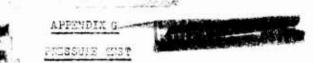
Carenograph Type: Counter Initiator Type: Limiline

Test accomition: Cartridge, SA, Caliber .280, Sall, Lot 19A

FAUID FO.	15	INC. A ENELL VELCETY AT YET, for		PIPGEURE, Pai
1 2 3 4 5 6 5	7110	ENTIL VOI GITY AT 7 2529 2554 2555 2295 2513 2522 2523 2523 2523 2524 2504	<u> </u>	Larmer armer Varmer 14.200 4.5750 4.2600 4.2500 4.2400
10 11 12 13 14 15 16		2528 2266 2697 2294 2261 2262	-	42600 h2500. h2500 h2500 h1900 h2600 h2600
17 18 19 20 21 22 23		2294 2265 2270 2276 2286 2273 2284		1;3700 145900 12100 1,2000 1,2800 1,31450 1,2100







re., 19-0

Time Started: 1000 Time Finished: 1040

Themreal Leadiver ho.:

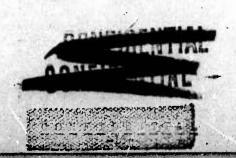
Darrel No.: 449-6 Frevious Rounds: 250

in matica a desaure: 70° Enge Temperature: 469° Pensity: 1.05

Caronograph Age: Counter Initiator Type: Lumilino

The Camitten: Cartridge, SA, AF, Caliber ,280, Let 24A

T- 10 MO.	The second secon	. WILDCITY AT 781, fps	PTESSURE, voi
1		2257	3 85 0 0
<u>1</u> 2		2285	3 8500
5		2306	3 S3 00
<u>5</u>		2263	36100
5		2305	39200
3		2283	30400
7		2232	39200
â	•	2207	37850
8 9		2220	38100
10		2130	39200
11		2203	39400
12		2201	35400
13		2213	Lidioo
13 14		2268	40100
15.		2235	38500
16		22/1	41200
17		2214	40400
18	•	2232	39600
19		2130	39.600
20		2223	39400





คลอริงชาติ ซาร**า**

Mine Startsd: 1250 Time Finished: 1550

Minercal Pangiver So.: Earrel Mc.: 140-6 Previous Founds: 275

Limitation to operature: 470°; Forge Tempurature: 40°p Density: 1,095

Arthograph Type: Counter Initiator Type: Demilino

That assemition: 6 rtribe, 30, 401, Ualiber .230, Lot 23A

Transport Transport	Darra Banka a Logica at 781, 2-1	PTTS SUIF, rai
1	2227	58100
2	2252	381 00
3	2231	39000
1	2145	39850
2.00 mg	2132	1,1000
5	21-5	7.3500
7	2169	39200
8	E182	41000
9	2184	39630
10	2219	53300
		20200
11	2190	38100
12	2190	38500
13	2212	39600
14	2179	591,00
13 14 15	2206	39600
16	2175	Lolico
17	2179	39200
18	2177	39000
19	2185	1,1600
20	2199	42500





Tate: 2 1950 Time Started: 1100 Time Finished: 1140

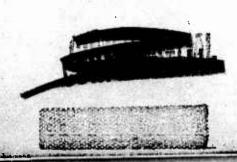
Unit stal apparture No.: Larrol No.: 149-6 Previous Rounds: 500

Assembled larger ture: 476°F Pango Temperature: +L9°F Density: 1.024

Communication Of the Communica

Durt & uniform: Cartridge, Cl., CCS, Caliber . 200, Lot 17A

The state of the s	LUTE BEEL WELSELY AT 78', fps	Prossure, poi
1 2 5 7 3 9 10 11 12 13 14 15 16 17	2374 8 2363 2331 2339 2507 2307 2307 2362 2367 2367 2367 2367 2367 2393 2303 2313 2363	5 9200 59400 59200 59200 59650 5650 5650 5650 57400 5920 56750 56100 57850 56750 56750 56500
18 19 20	2350 2305 2320	37600 371400 37600



APPENDIX G

PRESSURE TEST

Time Started: 1515 Time Finished: 1540

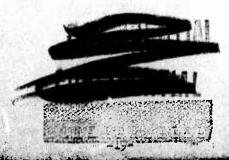
Universal Receiver Ro.: Barrol No.: 149/6 Frevious Rounds: 74

Remunition languagements -65°F Range Temporature: 35°F Density: 1.083

Chronegraph Type: Counter . Initiater Type: Limiline

Trot A munition: Ourtridge, Ball, Califor .280, Lot 19A.

ACTED NO.	TEST OF THE VELCO MAT 701, CES	272530,2, -11
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 6 17 18 19 20 21 22 23 24 25	Valuer Varior Va	38550 36703 36200 44100 44100 44100 46750 46100 58550 37200 36050 36050 38100 38500 36500 36500
		77600





APPENDIX G

PRESSUID EDST



Pare: 15 First 1950 Time Started: 1300 Time Finished: 1415

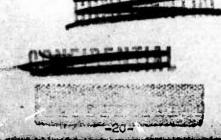
Taivered Macoiver West Barrel No.: 149-6 Previous Rounds: 175

-initial recognition, +loger Image Comperature: 447°F Penaity, 1.023

Emmagraph Chy: Counter Kaitiater Type: Lumiline

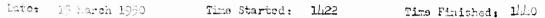
and a million: Jardridge, Sa. 21.1, Caliber .260, Lot No. 19A

	Figthmuch Vilodits At 781, fra	PRESSURE, Uni
1 2 3 4 5 6 7 0 9 10 11 12 15 14 15 16 17 10 20 21 22 23 24 25	2,57 2,74 2,74 2,74 2,51 2,52 2,55 2,55 2,56 2,57 2,54 2,54 2,54 2,54 2,56 2,52 2,50 2,51 2,50 2,50 2,50 2,50 2,50 2,50 2,50 2,50	45900 45900 45900 45900 47300 44600 44600 44600 44400 45000 44600 45000 45000 45000
ă - /		4,000





PPESSURE TAST

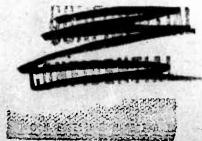


Universal Account No.: Barrel No.: 419-6 Previous Rounds: 200

Admittica Imperature: -165°F Range Temperature: +47°F Density: 1.028

Test Amerition: Sertridge, SA, AP, Califor .280, Lot to. 254

27.15 .10,	INSTITUTED L VOLOCITY AT 781, fas	FIESSUMI, 'si
1 2 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2276 2271 2270 2270 2270 2254 2255 2266 2266 2265 2245 2252 2264 2252 2264 2254 225	40550 58150 39700 39800 40550 40550 39450 39700 40000 40000 39700 39700 39700 39700





APPENDIN G

PRESSURE TEST

Date: 15 Jorda 1950 Time Started: 1355 Time Finished: 1435

Universal Passiver No.:

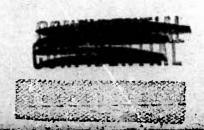
Barrel No.: 149-6 Previous Rounds: 225

sample of the state of the stat

Organical Type: Commer Initiator Type: Lumilino

That demunicien: Cartninge, SA, AFI, Caliber .280, Lot No. 23A

7 (7) 77 5 0		TOUTEN	L VELOCITY AT 781, for	PRESSUIE, psi
1 2 3 5 6 7 10 11 12 13 14 15 16 17 18		2.01.332	2296 2325 2343 2343 2343 2352 2367 2247 2252 2260 2338 2219 2256 2219	41200 357.0 42600 41600 41200 41603. 43400 40550 42500 42100 39700 42100 36150 40800
19 20 21			2218 2231	39600 38150
22		- 4 man -	Lost 2242 2262	Lo st
23 24 25 26	27 L		. 22/12	41400
54			22:22	39.600 414.00
2) 26			2204	40000
20			C-04	40000







APPENDIX C

PRESSURE TEST

fate: 28 March 1950 Time Started: 1315 Time Finished: 1355

Universal Pecsiver No.:

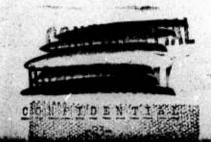
Earrel No.: 4,9-6 Frevious Rounds: 321

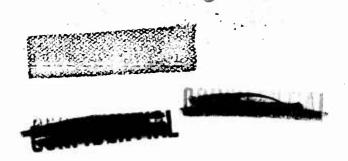
Admittion Temperature: -05°F Range Temperature: +70°F Donsity: .979

Cronograph Type: Counter Initiator Type: Limiline

that Amemitian: Cartridgo, SA, CES, Caliber .200, Lot 17A

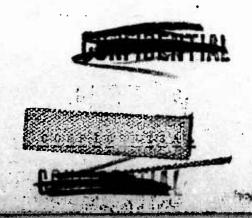
nound no.	TIG! TURENTAL	MICOILLA	AT 781, fns	PINSSUPE, pol
1 2 3 h		, lor - ene		
5 6 7 . 3 . 9 10		2250 2279 2259 2273 2380		36100 50300 1.700 35 200 7.7200
11 12 13 14 15 16 17		2277 2211 2215 2216 2229		36500 35900 35200 35400 36700
19 20		2293 - 2269 2012 2013 2296		36700 35200 35600 35200 37000
21 22 23 입 입 당		2259 * 2260 * 2260		36700 36700 36100 36500
۲)		2525		37200





APPENDIX H

Firing Data for Cartridge, SA, Caliber .280, Ball, Lot 40A (6 sheets)





VEI OCITY THET

Into: 15 1-1, 1950 Timo Filared: 1514 Pine Finishel: 1527

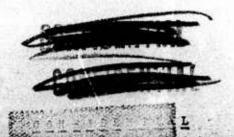
10 A. real Floriver So.: Carrol Wo.: 129-5 iretious Counds: 321

Dansity 1.323

Contigues to Courter of maitintor type: Lumilia

Ter. _municia: @artr_dge, Ball, Caliber .50, Shock, Lot No. LOA.

F11 10 MC.	TERMINIST V LOST V AT 731, fra	F TSURE, tol
1 2 3 4 5 5 6 7 7 3 9 10 11 12 15 14 15 16 17 18 19 20 21 22 23 24 25	2202 2255 Lost 2274 2246 2246 2232 2239 2233 2238 2230 2222 2204 2222 2204 2223 2231 2232 2231 2232 2237 2236 2232 2237 2236 2232 2237 2236 2232	





APPENDIXH

VELOCITY TIST

Date: 15 March 1950 Time Started: 1455 Time Finished: 1510

Universal Paceimer Ro.:

Parrel Mo.: 449-6 Previous Rounds:

Arrandition Temperature: 470°7 Arra Comperature: 447°7 Density: 1.023

Chrom rain Sign: Country Initiator Sign: Lumilino

Diet I mmitien: Cartriage, Dall, Caliber .30, Clack, Lot No. 1,04.

DISTRIBUTE VICTOR AT COLUMN PUR	GGU/E, Sai
1 Lost	
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
1 Lost 2 2352	
Lost	
5 Lost 6 . 2218	
7	. #
2053	
3 9 2246	
2015 6	*
11 2108	
12 2232 13 2243 14 2238 15 2204 16 2217 17 2256	
13 2263	
1/1 2235	
15 2201	
16 2217	
17 2236 ~	
18 2205	
19 2218	
20 2207	
21 2208	
22 2220	
23 2222	
22 220 23 222 21 224	
12	





Time Started: 0941 Time Finished: 0955

Tarrel No.: . 449-5 Previous Rounds: 231

Mornaition Amperware: 070°F Tango Temperature: 52°F ... Poncity: 1.000

Connegration type: Country Initiator Type: Lumiline

1 of Immediator: Cartriare, Hall, Coliter .200, Lot 40A.

- 77 11214	THE THE SELECTION AT 781, Ins	PERSUIE, wit
1075-756	2 43 223 2282 2285 2266 2306 	
12545670901123456789	2010 2227 2251 2251 221 2218 2275	
15 16 17 18 19 20	2205 2251 2208 2234 2244 2244 2264 2206 2205 2205	
21 22 23 24 25	2236 2205 221 :0 2208 2203	





Pate: 10 March 1950 Time Started: 1131 Time Finished: 1150

A livereal receiver Ac.: Carrel No.: 449-6 Frevious Rounds: 110

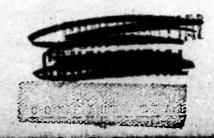
-unfillen is i pratero. 70°F Dancity: 1.890

Trottograph ger: Counter Initiator Type: Inmiliate

1 - 1 - mistra: Carbridge, Ball, Caliber 120, Lot 404.

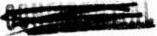
The state of the s	Elegrana L Telegra AT 701. fos	FITISSUME, 191
1 2 5 4 5 6 7 0 9 0 11 2 5 4 5 6 7 6 9 0 12 2 2 2 2 5 4 5	2219 2315 2315 2315 2316 2351 2351 2377 2350 2322 2221 2257 2278 2269 2252 2215 2232 2219 2231 2259 2168 2252 2214	
_		

Rounds 1-5 - Marmers.





PESSUE EST



Date: 10 March 1960

Time Started: 1255 Time Finished: 1320

Phiver at Teceiver West Earrol No.: 449-6 Frevious Rounds: 140

unnumiation lumporusure, 70°3 | Funge Temperature: 36°F | Density: 1.000

That Lammition: Dartridge, Hall, Calibor .210, Lot 40a

1.,000	INSTELLIBLE CRICOL II AT 781, 113	PHESSUME, pai
1	2175	
1 2	2175 22,3 2518	
3	2518	
I_{L}	2307	
5.5	2707 2208	
3	2216	41550
7		4.70
9	·	13000
9	2219	1,5000
. 16	22KL	1,3200
11	2272	12550
12	2219 2264 2272 2271	4270 4300 4300 43200 43200 43000 43450 43450 43000 43000
7%	2271	1.3900
	2257	โรโรก
13 14 15 16	2104	Lalao
16	2230	L3L50
17	2222	43000
13	2197	L 3000
13 19	2271 2271 2194 2230 2222 2197 2221	L3000
20	2205	42550
21	2205 22L/L	42550
22	2216	42550
25	2197	41850
عَلَ	2202	43450
22 25 24 25	2210	42200

Rounds 1-5 - Warmers.







Date: 10 : rok 1950

Time Started: 1027

Time Finished: 1100

Universal cocsiver No.:

Barrel No.: 119-5 Previous Rounds: 258

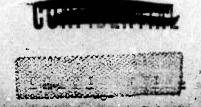
Amounities imperature: 470°F France Democrature: 432°F Density: 1.090

Coronograph type: Counter Initiator Type: Lumiline

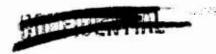
Cost Ammition: Curtridge, Ball, Substandard, Caliber .200, Lot No. 404

70 272 270.	DESIDENZAL VILOCITY AT 781, fra	PINSSUM, mai
1 2 5 4 5 6 7 9 10 11 12 15 16 17 18 19 20 21 22 23 24	2221 2238 2255 2263 2276 2273 2255 2210 2213 2219 2220 2211 2229 2231 2230 2169 2252 2237 2217 2217 2217 2217 2217 2217	1,3000 41653 43450 42200 42200 42750 42750 42750 43600 43000 43450 43450 43450 43450 43450 43450 43450
25		42550

Rounds 1-5 - Warmers.



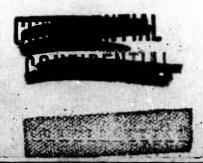




APPENDIX I

Firing Data for Cartridge, Caliber .30, Ball, Tlou,
Lot No. FAX30-1358 Fixed from Pressure Rifle

(2 sheets)





PRESSURE 1137 .

2:to: 16 March 1950 Time Started: 1023 Time Finished: 1125

Frevious Francis 211

agreed graph tree: Counter Initiator Prys: Limiline

1 Lt Americales: Curtifique, Ball, Calibor .30, Lot PARSI-1998.

-313 MO.	IN COUNTY A POST AT 700, 200	1 75U/P. onl
1 2 3 4 5 5	2726 Lost	25700 76000
3 L	Lost 2750	50600 48400
5	2741	45700 49800
	. 272 8 275 2	29600 29600
7 8 9	:772	29600 149600 146600
10	2709 2716	1,6500 46600
11 mg (1) 11 mg (1) 12 mg	2738 2703	- 49000 45100
13	2729	<i>1</i> ,5600
13 2.4 15 16 17	2694 - 272 2	1.1.700 1.1.1000
15	269 5 268 7	47000
18	2703	45800 43100 ·
19 20	267h 2698	45600 47400
21	2740	49700
22 23	2734 2707	45800 45800
22 23 ^' <u>'</u> 25	2691	Li7200
6.7	2722	17800

Rounds 1-5 - Warmers.



1 15 115

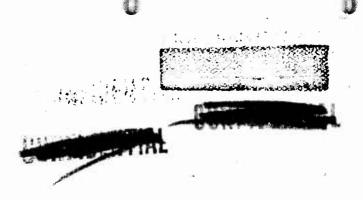
The Started: 1145 Tim Finished: 1835

The control of the co

Tree raph Tree Counter Existator Type: Lealling

has acceptance Carteline, Ball, Gallber .50, 2004, Lot 81/20-1350.

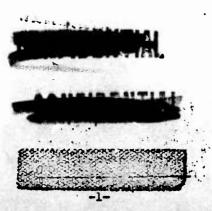
No year to street as most representative	en e e e e e e e e e e e e e e e e e e	nyi fooni at 731, fra	F. C. T. T. C. C. S.
123758759	. =	27 73 274 7 2654 2772 2322 2693	14400 43200 47700 143700 143700 142700
10 11 12 13 13 15		-7-7 276 7 Lost 2729 2714 2752	4,6500 1,2700 1,5700 1,0200 1,500
17 18 19		2751 2716 2758 2706 · 4747 2732	451,00 45200 45200 46100 47400 49000
21 22 23 24 25		2746 2722 2758 2726 2732 2793	47300 43300 14,600 45400 44,000 44,400
26 Rounds 1-5	- Warmers.	2746	1487°CO



APPENDIX J

FIASH FIRING DATA
WACHINE GUN AND RIFLE

(5 Sheets)





FLASH FIRING DATA

22 Earch 1950

Rifle, Lightweight, Caliber .30, T-25 No. 10
Previous Rounds - 349
Annunition: Cartridge, Ball, Caliber .30, T104 Lot No. FAX30-1358

Without Flash Hider

TILE	ROUNDS	REPARKS
1000 1010 1012 1020	349-354 355-359 360-365 366-385	Function firing OK FF. 3 Short Recoil FF 4 Short Recoil Function OK, Flash about 5" x 5", white in middle with red tinge to outer edges. Few sparklers going forward. No flash on one round. No breech flash.
		and a boundary of the same a

With Flash Hider

	_		
1030		Function CK, Flash about 4^n long, ve smokish pink in color. Two rounds g flash.	

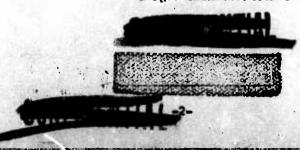
Rifle, Caliber .30L1, No. 3830498
Previous Rounds - 405
Ammunition: Cartridge, Ball, Caliber .30L-2 Lot No. FA-4059

Without Flash Hider

1035	405-408	Function Firing, OK.
1035	409-428	Function OK. Red flash with small white core. Flash about 8" long and 4" in diameter. No breech flash however muzzle sparks 6 to 8 feet long.

With Flash Hider

1040	429-446	Function OK. Dull flash. Sparklers on every
		round, Entlong. All sparklers in forward direction. No breech flash muzzle flash appears slightly
		larger than that from T-25.





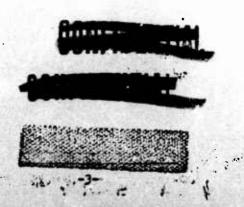
Rifle, Auto, Caliber .280 EM2, No. 3
Previous Rounds - 602
Ammunition: Cartridge, Ball, Caliber .280 Lot 19A

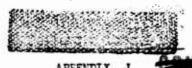
TILE	ROUNDS	REMARKS	
1050 1050	603-606 607-626	Function only, CK Function CK, Dull red to orange flash. sparklers on every round.	Several

Rifle, Auto, Caliber .280, FN No. 4
Previous Rounds - Approx. 1000
Ammunition: Cartridge, Fall, Caliber 250, Lot 19A

Without Flash Hider

1100 1100	1001-1004 1005-1014	Function, CK Function, OK, orange flash with white fringe. 6 to 8 in. long x 6 in. in diameter. Yany sparklers going forward. One white flash in front of muzzle on about 12th round.
1105	1015-1034	Function OK, No appreciable flash; However, a shower of sparklers forward on every round.





APPENDIX .



21 March 1950

Gun, l'achine, Caliber .30, M1919A4 No. 839252, (converted); Earrel No. T65E2-4. (New)

TIVE	FBL ROUNDS	APPUPITION	REMARKS
1100	0–20	Caliber .30, Eall, T104 Lot No. FAX30-1358	Pinkish yellow flash 10 to 12 inches long. Red tinge on edges. No definite core. Sparklers in front of main flash going forward.
1105	21-40	Caliber .30, AP, T-93 Lot No. FAX3C-1357	Yellow flash about 10" long, red fringe. Fain flash forms about two inches from muzzle. Sparklers travel 3 to 4 feet forward.
1115	41-60	Caliber .30, API, T-101 Lot FAX30-1356.	Yellowish Flash with red fringe, 10 to 12" long. Yain flash 2" in front of muzzle. Sparklers 3 to 4' long.
1135	61-80	Caliter .30, Tracer, T-10 Lot FAX30-1359	of muzzle. Rose pink in color. Fore sparklers than previous ammunition.
1135	81 - 100	Caliber .30, Spotting T- Lot No. 2 103	Pinkish yellow flash 5 to 6" long with red fringe. Sparklers about 3 to 4 ft long going forward. Smallest of all flashes from caliber .30 ammunition. Vain flash about
			2" from muzzle.

Gun, Machine, Caliber .290 M1919A4 (Converted) No. OW 4966

1320 0-20

Call Lot

Frange colored flash 5 to 6 inches long, 2 to 3" in diameter. Sparklers 3 to 4" long.



TIME	BEL DOW	GLITION	PEN'ARKS
1325	21-30	Cartridge, AFI Caliber .280 Lot 23A	Failure to feed. About the middle of the burst a large incandescent white flash occurred in front of muzzle. This was probably due to the ignition of accumulated powder gases.
1335	31-50	Cartridge, API Caliber .280 Lot 23A	Orange flash 5 to 6 inches long 2 to 3 inches in diameter. Sparklers going forward about 4 ft. Flash has a fringe on edges.
1400	51-70	Cartridge AP Caliber .280 Lot No. 24A	Large flash on 1st round. Furst flash was orange in color similar to that of Fall Ammunition. Few Sparklers.
1410	71-90	Cartridge, OBS Caliber .280, Lot 17A	Observation difficult due to muzzle burst of one round near middle of turst. Flash appears similar to that of AP and Eall.
1445	91-110	Cartridge, OES Caliber .280, Lot 17A	Muzzle burst occurred about 1st round, 1 to 3 ft from muzzle. Flash similar to that from Eall Ammunition.
1510	111-130	Cartridge, Tracer Caliber .280 Lot No. 32A	Feather shaped flash 4 to 5 in. long, 2" in diameter. Dull red color. Sparklers going forward.





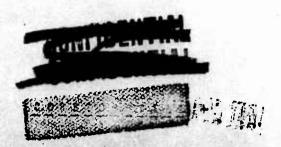
APPENDIX K

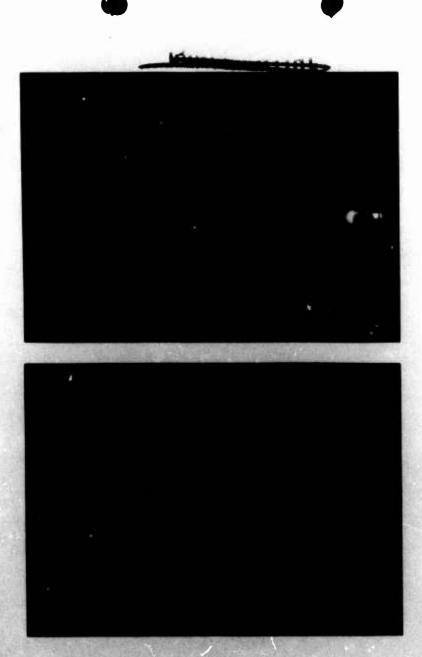
Photographs of Flash Characteristics

Camera Position A - 4.5' Left of Gun Mussle

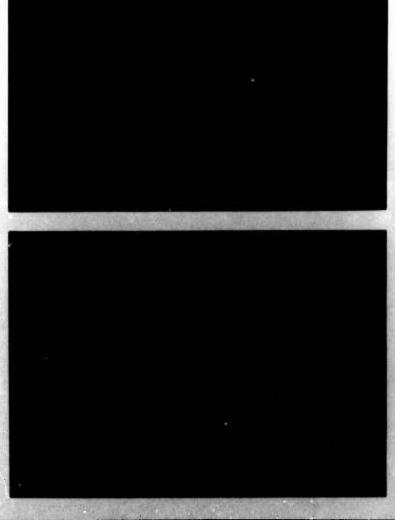
Camera Position B - 2' Left and 3.5' to Rear of Gun Muzzle

APG Photographs A61142 A61145 A61155 A61149 A61146 A61151 A61156 A61147 A61152 A61157 A61148 A61153 A61158 A61144 A61154 A61159



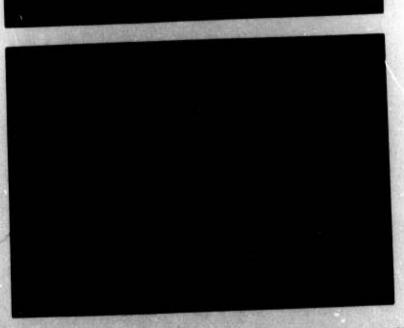


CONFIDENTIAL



A61143

Project No. TS2-2015. 9th Report. Schulette Flash from 20 Rounds of Ball Ammunition Fired Semi-Automatic from Rifle, Lightweight, Cal. .30, T25. (TOP) w/o Flash Hider (ACTTON) with Flash Miler. Camera position B.



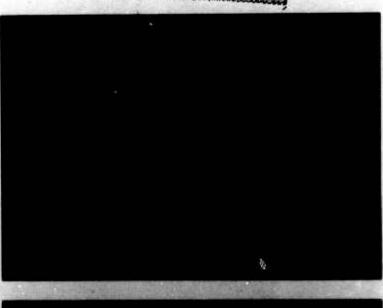
AG1144

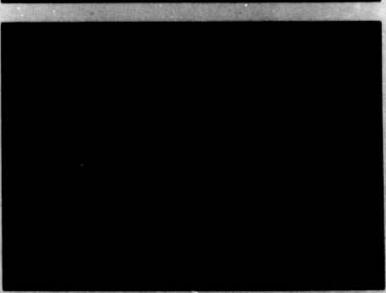
L S ABERDEEN PROVING GROUND 3

28 March 1950

Project No. TS2-2015. 9th Report. Cu Flash from 20 Rounds of Rall Ammunition Fired State Automatical Cu Flash Rider. (TOP) w/b Flash Rider.

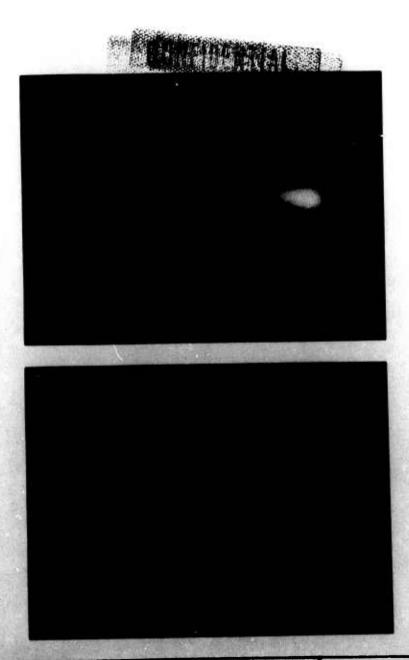






A61145

Project No. TS2-2015. 9th Report. Simulative Flash from 20 Rounds of Pull Ammunition Fired Semi-Automatic from REFILE Auto. Cal. .280, F.N. (TOP) w/o Flash Hider.



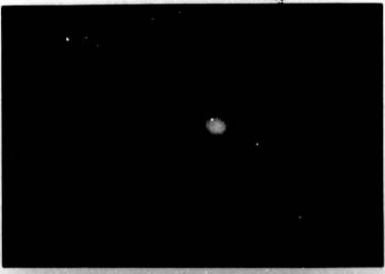
AG1146

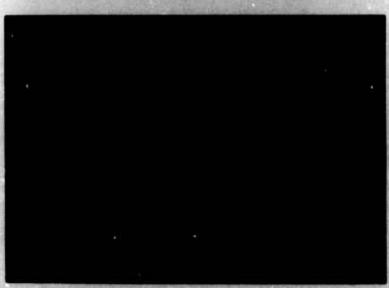
Project No. 732-2015. 9th Report

Rall Ammunition Fired from Rifle. 9 Mil. (POP) w/o Flash Hider.

(POTTOM) with Flash Hider

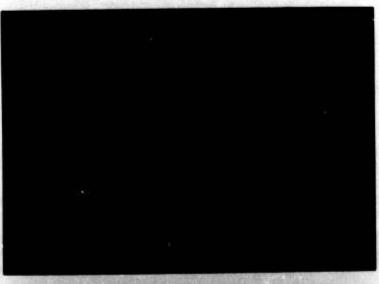
CONTROL ...

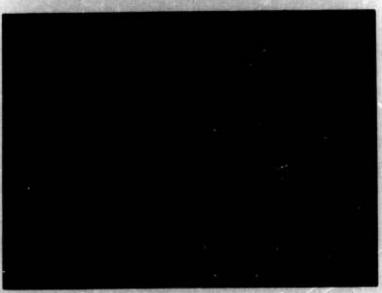




A61147 0 S ABERDEEN PROVING GROUND 8 28 March 1950 Project No. TS2-2015. 9th Report. (Ball Ammunitton Fired from Example 1950 W/o Flash Hider. (BOTTOM) with Flash Hider.

A Contraction of the second second





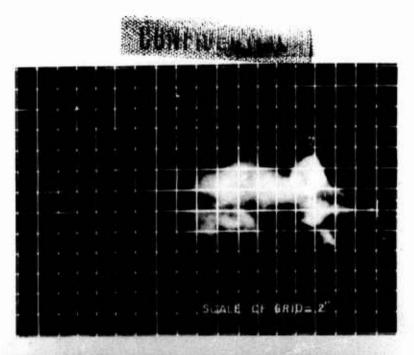
A61148 4 Flash Hider.

& ABERDEEN PROVING GROUND &

(相) 中国 (1)

28 March 1950

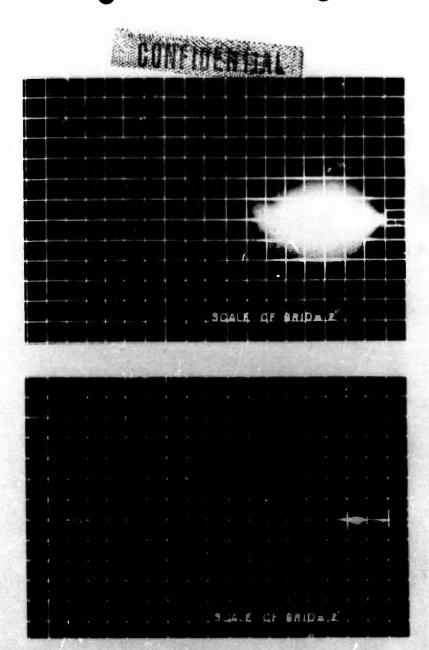
Project No. 752-2015. 9th Report. Completive Flash from 20 Hounds of Ball Ammunition Fired Semi-Automatic from Hifly, Auto, Cal. .280 KM2.
(TOP) Camera position As American position B. No provision for Flank Hider.



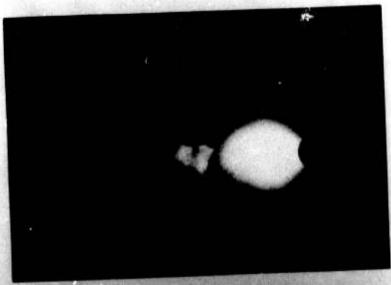


A61149

Project No. TS2-2015. 9th Report. Fl. Round Burst of Cartridge S.A., API. Cal. .280 Mich. No. on of Cases in Front of Muzzle Caused Flash. (BOTTOM) Camera Position B.



TOTALINAL





AG1151

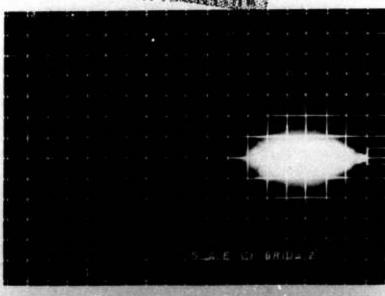
AG1151

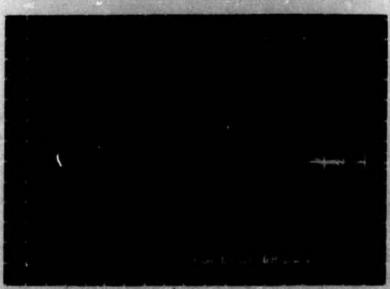
AG1151

AG1151

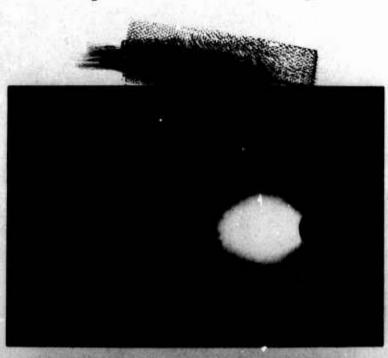
Project No. TS2-2015. 9th Report. Flack from Round Burst of: TOP:
Cartridge, Ball, Cal. .30, T104, Lot FAX30-13b
Ball, Cal. .280, Lot No. 19A. Camera Position

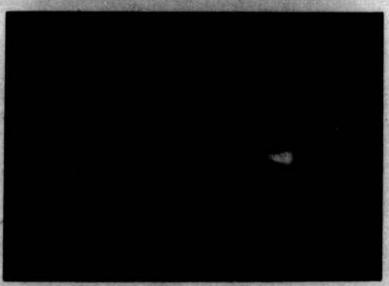




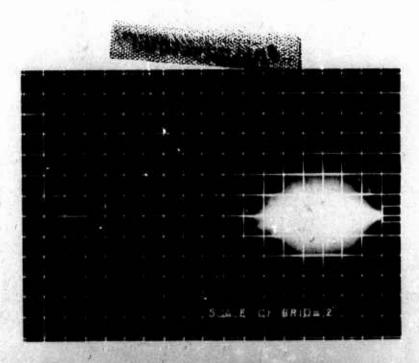


A61152 ABGRDEEN PROVING BANK 196
Project No. TS2-2015. Oth Report. Plack 196
Cartridge, A.P. Cal. .80, T93, Let PATS0-136
Cal. .280, Let No. 24A. Cemera Position A.





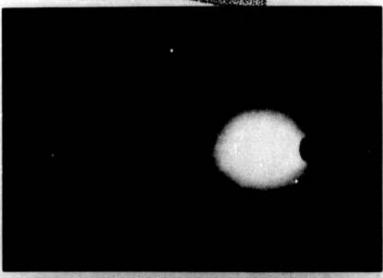
A61153 ABERDEEN PROVING GROUND 8 28 March 1950 Project No. TS2-2015. 9th Report. Flash Ar 20 Round Burst of: Top: Cartriage, A.P. Cal. 30, T95, Lot FAX50-155. Burrows Cartriage, A.P. Cal. 280, Lot No. 24A. Cartriage A.P.

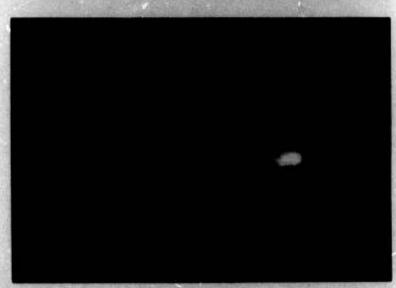




A61154 ADERDEEN PROVING GROUND & Project No. 782-2015. 9th Report. Plant from 30 Cartridge, A.P.I. Cal. .30, T101, Lot PAX30-138 A.P.I. Cal. .280, Lot No. 23A. Camera Position A.

28 March 1950 Burst of: TOP: -CONFIDENCE



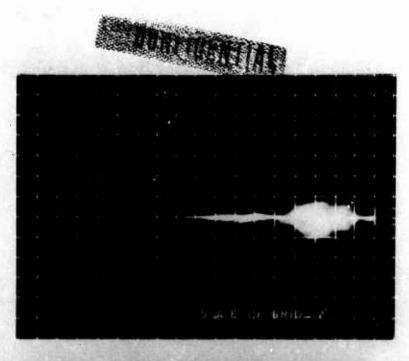


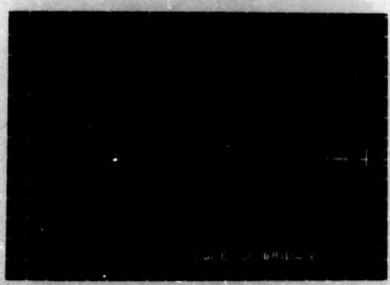
A61165

& ABERDEEN PROVING GROUND &

28 March 1950

Project No. TS2-2015. 9th Report. Plant From 20 Round Burst of: TOP: Cartridge, A.P.I. Cal. .30, Tiol of PAXSO-1351 - BOTTOM: Cartridge, A.P.I. Cal. .280, Lot No. 23A.



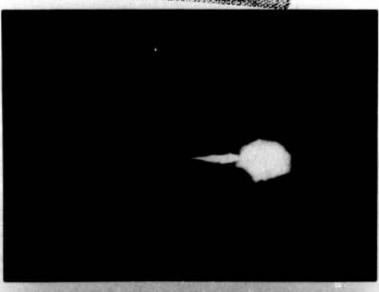


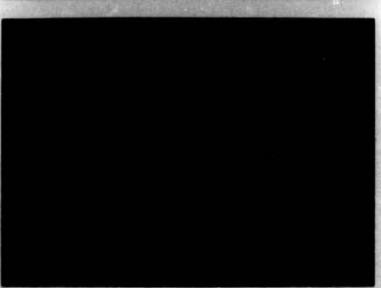
A61156

Project No. TS2-2015. 9th Report. Plash Total Cartridge, Tracer, Cal. .30, T102, Lot PAX30-156

Tracer, Cal. .280, Lot No. 32A. Camera Position

CONTENTANTO,

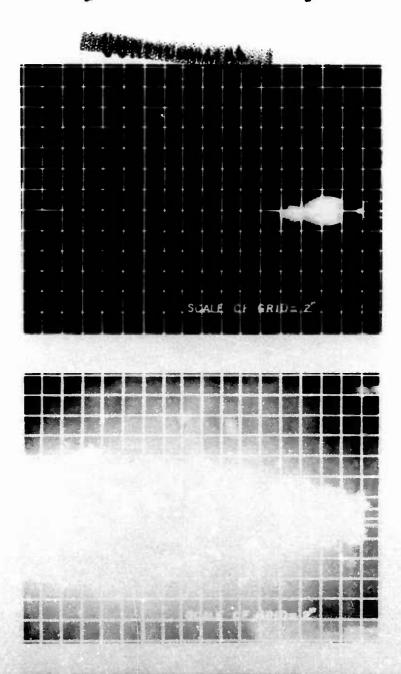




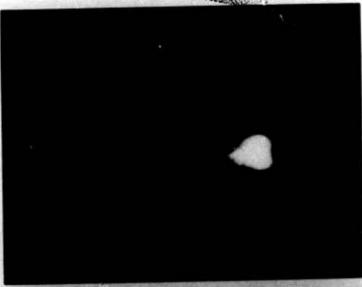
& ABERDEEN PROVING GROUND &

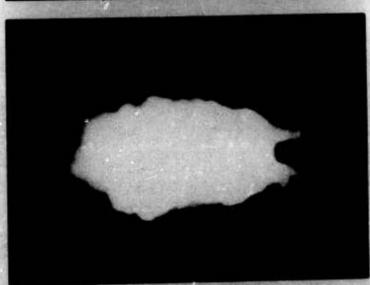
28 March 1950

The Ro. 752-2015. 9th Report. Flash From 30 Sound Burst of: TOP: 1 man, Tracer, Cal. .30, T102, Lot FAX30-1650 Cound Burst of: Cartridge, 20, 101. .280, Lot No. 3

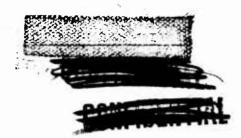


 PORT THE PROPERTY.





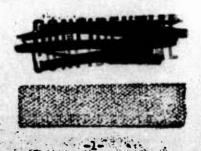
ACTION ADERDEEN PROVING TOURD SS Nameh 1960
Project No. 732-8015. Standard Project No. 732-80



APPENDIX L

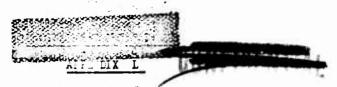
FIRING DATA - SLOKE CHARACTERISTICS

(2 Sheets)



145





S'CKE CHARACTERISTICS '-

20 April 1950 TEMP: 46°F DEMISITY: 1.040 Cloudy

WEAPON: Gun, Machine, Modified, Caliber .200, M1919A4 No. 084966, Barrel No. 4, Previous Rounds: 445

TIME	ROUNDS	ALW UNITION	RELARKS					
0915	446-470	Caliber .280, AP, Lot 24A	Function OK. Smoke grey-white in color and quite thin. Target not obscured.					
0920	471-545	Caliber .200, AP, Lot 24A	1 FF. Grey-white smoke, thin density. Target not obscured.					
0930	546-620	Calliber .280, Trace Lot 32A	er Function OK, Smoke darker grey-white than above and slightly thicker. Daylight visibility of trace, excellent.					
WEAPON: Gun, Machine, Modified, Caliber .30, M1919A4, No. 839252 Earrel No. 4, Previous Rounds - 315								
0935	316-390	Caliber .30, AP, 193, FAX30-1357	Smoke grey-black in color and very thick as compared with that from					

Caliber .30, AP,
193, FAX30-1357

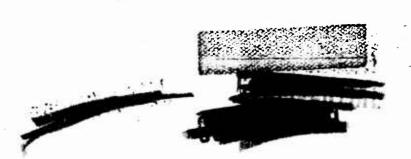
Thick as compared with that from caliber .250, AP armunition. Target not obscured; However, more difficult to see than when firing caliber .250

AP. Smoke also noticed to have a more irritating effect on observers' throats.

0940 391/465 Caliber .30, Tracer Smoke grey-white in color and not as
FAX30-1359 thick as above. Compares with that
from Caliber .250 tracer, possibly
slightly thicker. Daylight visibility
of trace, excellent. Not as bright as
Caliber .250 trace.

WEAPON: Oun, Kachine, Caliber .30, 11919A4, No. 523242 Barrel No. A4-9, Previous Rounds: 410

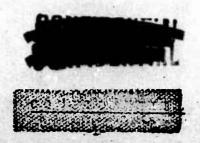
O945 Caliber .30, Pall, Dark grey-white smoke, very thick. Of the ammunitions fired this gave the greatest amount of smoke; however, not the darkest.



APPENDIX M

TRACE TEST FIRING DATA

(5 Sheets)







TRACER FIRING - (LENGTH OF TRACE)

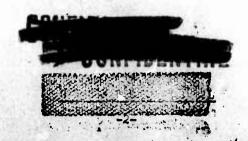
Gun, Machine, Caliber .30, M1919A4, No. 839252

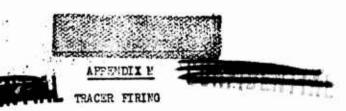
Ammuni Lon: Cartridge, Caliber .30, Tracer, T102, Lot No. FAX30-1359

Barrel No. T/5E2, No. 4

Previous Rounds: 100

ROUNDS	YARDS	RCUNDS	YARDS	ROUNDS	YARDS	RCUID	YARDS
1-20	Locators						
21	900	41	£75	61	875	81	900
22	900	42	875	62	900	82	875
23	875	43	875	63	900	53	900
24	875	44	875	64	875	84	875
25	875	45	875	65	875	85	275
26	900	46	275	66	850	86	900
27	875	47	900	67	875	87	٤75
28	875	48	275	68	900	88	900
29	875	49	900	69	900	89	875
30	875	50	875	. 70	875	90	875
31	875	51	875	71	875	91	900
32	875	52	675	72	875	92	900
33	875	53	875	73	875	93	900
34	875	54	875	74	900	<u>94</u>	É75
35	900	55	875	75	875	95	875
36	900	56	850+	76	875	96	850
37	850	5 7	850	ว ีวั	875	9 7	850
38	875	58	875	78	875	98	675
. 39	900	59	875	79	875	99	875
40	875	60	850	80	875	100	900

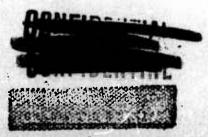


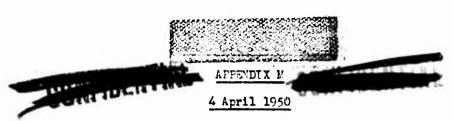


Gun, Machine, Caliter .290, M1919A4 (Mod) No. 007 4966 Ammunition: Cartridge, SA Caliber .200, Tracer, Lot 32A Barrel No. 4 Frevious Rounds: 245

ROUN	DS YAPDS	RC'''DS	YARDS	ROUTES	YARDS	ROUNDS	YARDS	ROUNDS	YARDS	
1-3 Locators (Length of Trace - Yards)										
4	1075	26	1075	48	1050	70	1075	92	1075	
	1075	27	1000	49	1075	71	1075	93	1075	
5	1075	28	1075	50	1075	72	Lost	94	1075	
7	1.075	29	1075	51	1025	73	1075	95	1075	
ġ	1050	30	1075	52	1050	74	1050	96	1075	
8 9	1075	31	1075	53	1075	75	1025	97	1075	
1Ó	1075	32	1075	54	1050	76	1025	98	1025	
11	1050	33	1075	55	1075	77	1025	99	1050	
12	1025	34	1075	56	1075	· 78	1075	100	1050	
13	1025	35	1075	57	1075	79	1050			
14	1075	36	1050	58	1050	80	1075			
15	1.050	37	1075	-59	1050	61	1075			
16	1075	38	1075	60	1075	82	1050			
17	TP*	39	1025	61	1075	83	1050			
18	1075	40	1075	62	Lost	84	1025			
19	1075	41	1050	43	1075	85	1025			
20	1075	/ 42	1075	64	1075	86	1050			
21	1075	43	1050	65	1075	87	1050			
22	1075	44	1075	46	1075	- 88	1050			
23	1050	45	1050	67	1075	89	1075			
24	1050	46	1025	68	1075	90	1025			
25	1075	47	1050	69	1050	91	1075			

^{*} Total Blind





TRACER FIRING (Length of Igniter)

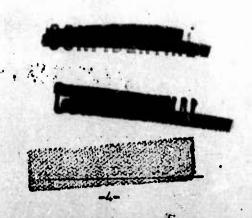
Gun, Machine, Caliber .30, M1919A4 (Mod), No. 839252

Barrel No. 4 Previous Rounds: 200

Amnumition: Cartridge, Caliber .30, Tracer, T-102, Lot No. FAX30-1359.

Length of Igniter in Yards

ROUNDS	YARDS	ROUNDS	YARDS	ROUNDS	YARDS	ROUNDS	YARDS	PCUMDS	YaED3
1	40	21	40	41	40	61	70	21	FC
2	40	22	50	42	40	62	60	82	45
3	40	23	40	43	45	63	60	83	60
4	40	24	45	44	45	64	70	94	70
5	40	25	40	45	50	65	60	85	60
6	30	26	40	46	40	66	60	86	40
7	30	27	45	47	40	67	55	٤7	40
g	35	28	40	48	45	68	45	88	65
9	55	29	45	49	50	69	70	89	60
10	55	30	40	50	50	70	55	90	70
11	50	31	40	51	45	71	50	91	40
12	40	32	35	52	fo	72	55	92	FO
13	35	33	45	53	55	73	50	93	65
14	40	34	40	54	45	74	65	94	50
15 -	45	35	40	55	70	75	50	95	50
16	40	36	45	56	70	76	45	96	65
17	40	37	40	57	55	77	50	9 7	65
18	40	38	40	58	60	78	40	98	50
19	40	39	40	59	70	79	70	99	ŧο
20	35 🗻	40 minus	40	60	75	80	70	100	50



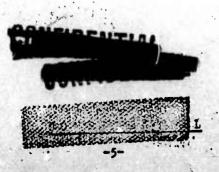


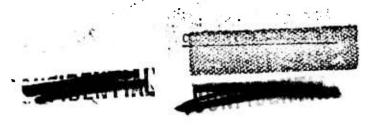
TRACER FIRING

Gun, Machine, Caliber .280, M1919A4 (Mod), No. OW 4966 Barrel No. 4 Frevious Rounds: 255 Observation for Length of Igniter (Mards)

ROUNDS	YARDS	ROUNDS	YARDS	ROUNDS	YARDS	ROUNDS	YARDS	RCUNDS	YARDS
•	75	21	60	41	60	61	60	81	FO
2	75	22	60	42	65	62	55	82	40
2	60	23	65	43	60	63	50	83	80
3	60	24	75	44	60	64	50	84	<i>F5</i>
4	50	25	70	45	60	65	50	85	65
?	70	26	65	46	70	66	50	86	65
6	65	27	55	47 .	65	67	65	E7	65
7		28	έο	48	70	68	65	88	65
8	75 65	29	75	49	90	69	65	89	70
9		30	75	50	70	79	50	90	60
10	65	31	75	51	70	71	60	91	55
11	60	32	90	52	70	72	60	92	\$5
12	60		70	53	75	73	60	43	90
13	50	33	65	54	70	74	60	94	65
14	55	34	69	55	65	75	60	95	60
15	60	35	70	56	65	76	85	96	55
16	55	36 38		57	65	77	70	97	50
17	TB*	37	70 65	58	60	78	60	98	50
18	70	38	60	59	50	79	65	9 9	50
19	65	39		60	50	έÓ	75	100	50
20	60	40	60	~		. •	. ,		

+TB - Total Blind

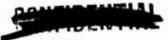




AFPENDIX N

GRENDADE FIRING DATA
(7 Sheets)





DATE: 3 April 1950



Direction Fire: SW Wind: Calm

MEAFON: Rifle, Lightweight, Caliber .30, T-25, No. 14
ANNUNITION: Cartridge, Caliber .30, Grenade, T-116, Lot No. FAX30-1367
Rifle Fired at 30° Angle to Horizontal.

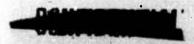
Grenade, Practice, V11A2, Lot E-19

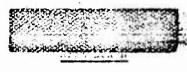
ROUND	RANGE, FT
1	649.0
2	590.0
3	605.0
4	595.5
5	No record, round struck guide brace.
5 6	609.0
7	<i>6</i> 33.0
8	616.5
9	609.0
10	625.0
11	641.0
Average	617.3
Maximum	649.0
l'inimum	590.0

Same Rifle, Ammunition, and Grenade as above but fired with Grenade Ecoster Cartridge. Cartridge, Auxiliary, Grenade, 17, Lot FA-5-31.

ROUND	RANGE, FT
1	963
2	1024
3	960.5
4	894
5	936 ·
6	Lost
7	906
8	967
9	977
10	971
Average	955.3
Yaximum	1024.0
Minimum	894.0







Rifle, Auto, Caliber .200, EM2, No. 6
Ammunition, Cartridge, Grenade, SA Caliber .280 Lot No. 20E
Grenade, Practice, M11A2, Lot E-19
Thirty Degree Angle to Horizontal
Direction Fire: SW Wind: Calm

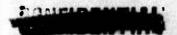
POUND	RANGE, FT
1 2 3 4 5	711.5 800.0 708.0 Fin Tube Ruptured. Head on grenade went about 150'. 477.0 Fin came off grenade in flight.
7 8 9 10	747.0 Fin Tute split, Head of grenade went less than 150'. Same as Round No. 7. 719.5 700.0

Average of six rounds - 731.0 ft F00.0 ft Finimum 708.0 ft

Rifle, Auto, Caliber .250 FN No. 6
Ammunition, Cartridge, SA Caliber .250 Grenade Lot No. 205
Grenade, Practice, Fila2, Lot E-19
Direction Fire: SW Wind: Calm

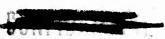
ROUND	RANGE, FT	
1 =	479	Tail came off grenade
2	730.5	_
3	730.5	
4	733.0	
5	766.5	
6	730.0	•
7	731.0	•
8	697.0	
9	703.0	
10	690.0	

Average, Nine Rounds 723.5 ft Vaxiaum 766.5 ft Hinimum 690.0 ft









DATE: 4 April 1950

WEAPON: Rifle, Lightweight, Caliber .30, T25, No. 15

ATTUNITION: Cartridge, Caliber .30, Grenade, T-116 Lot FAX30-1367

GRENADE: Practice, 111A2, Lot E-19

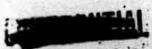
DIFECTION FIRE: SW

WIND: SSW, 21 to 28 mph

RCUPD	PANGE
1	472.0
2	576.5
3	583.0
	616.0
5	621.5
6	625.0
7	582.0
8	56.0
9	619.0
10	<i>f</i> 12.0
Average	589.3 ft
Maximum	625.0 ft
l'inimum	472.0 ft

Same Rifle, Assumition, and Grenade as above but fired with Grenade Booster Cartridge. Cartridge, Auxiliary, Grenade, 14-7, Lot FA-5-31

ROUND	RANGE, FT
1	901.0
2	462.0 Fin assembly came off in flight.
3	896.0
4	901.C
5	691.0
6	934.0
7	672.0
8	950.0
9	923.0
ıó	930.0
Average	910.8 ft, 9 grenades
Kaximum	950.0 ft
Vinimum	872.0 ft
	CONTROL OF STREET
	CONTROL OF THE PROPERTY OF THE







Date: 4 April 1950
Rifle, Auto, Caliber .250, EL-2, No. 8
Armunition: Cartridge, SA, Caliber .250 Grenade, Lot 205
Grenade: Practice, Rifle, Ella2, Lot E-19

RCUND	RANGE, FT
1 2 3 4 5	Fin assembly tube failed to leave launcher Fin assembly tube ruptured.
7 8 9 10	Choke Removed From Launcher 628 701 675 115 Fin assembly tube ruptured.

Average of 3 rounds - 668

Rifle, Auto, Caliber .200 FN No. 7
Armunition: Cartridge, SA, Caliber .200, Grenade, Lot No. 200
Grenade, Practice, Rifle, EllA2, Lot E-19

ROUND		RANGE, FT	
1 2 3 4 5	lis.	671.5 698.0 698.0 699.0 742.0	
6 7 8 9		720.0 707.0 742.0 707.0 698.0	•
Average Faximum Finimum		708.25 ft 742.0 ft 671.5 ft	
WEIAT		100 CO. 100 CO	



APPETDIX 1

17 April 1950

WEAPON: Rifle, Lightweight, Caliber .30, T-25, No. 15

GRENADE: Practice, V12A2, Lot E-19

A'NUNITION, Cartridge, Grenade, Caliber .30, Tl16

ANGLE OF FIRE: 45°

Constitution .

DIRECTION FIRE: SW WIND S to SW, 12 mph

GRENADE NO.	RANGE, FT
1	495 ·
4	687
· 6	<i>6</i> 46
18	<i>F</i> 14
31	669
Average	662

Powder Charge

41 grs - INR 4895

1 gr Black Powder - A -4

17 April 1950
Rifle, Lightweight, Caliber .30, T25, No. 15
Grenade, Practice, EllA2, Lot E-19
Fired at a 30° angle with butt of rifle resting on ground.
Direction of fire: SW Wind: S to SW, 10 mph.
Ammunition: Cartridge, grenade, caliber .30, T116.

Powder Charge 41 grs IER 4895 1 gr Black Powder, A4

ROUND	RANGE, YARDS
1 2	590 610
3	553 621
5	603
6 7	345, Lost Fin 650
7 8 9	615 617
10	5R0
Average	604
	greaters and the second





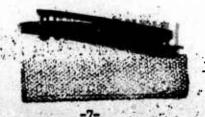
APPENDIX N

17 April 1950
Rifle, Lightweight, Caliber .30, T-25, No. 14
Grenade, practice, EllA-2, Lot E-19
Fired from 30° angle with butt of rifle on firm ground.
Direction fire: SW Wind: S to SW 10 to 12 mph
Ammunition: Cartridge, grenade, Caliber .30, Tll6

Powder Charge
41 grs INR 4595
1 gr Black Powder A4

Powder Charge
41 grs I!R 4695
1 gr f0 mm Fortar
Ignition Powder

GRENADE	RANGE, FT	GRENADE	RANGE, FT
1 2	589 592	1 2	575 593
3	599 621	3	5°6 5 60
5	616 618	5 6 7	571 607 576
7 8 9	592 , 625 602	8 9	621 607
10	588	ıó	595
Average	604	Average	590



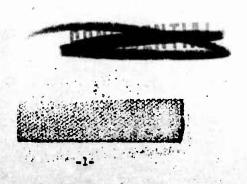




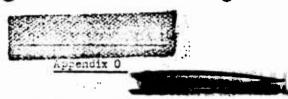
APPENDIX O

Firing Data, Ignition Characteristics

51 Pages







Incendiary Test

Guns

Mann Barrel (UK) No. 450/3 Prev. fired 243 rounds
Mann Barrel (US) No. 1528613 with Bbl 5 Prev. fired 145 rounds

Ammunition

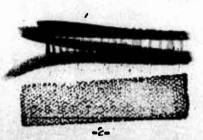
UK Ctg. API, Cal..280, Lot No. 23A US Ctg. API, Cal..30, T101, Lot No. FA X30-1356

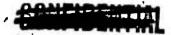
Fuel

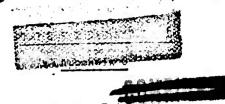
Gasoline, Automotive, 72 octane

Ranges

100, 300 and 500 yards

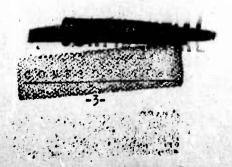


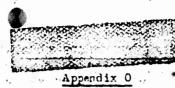




Weather Data

Date	Temp.	Pressure Inches Hq	Relative Density	Relative Humidity	Weather
2 Mar 1950 8 Mar 1950 9 Mar 1950 10 Mar 1950 13 Mar 1950 14 Mar 1950 15 Mar 1950 16 Mar 1950 17 Mar 1950 20 Mar 1950	37.5 56.2 29.7 36.5 40.0 50.0 50.0 40.5 42.8 la.8	30.36 29.67 30.06 30.16 29.73 30.19 30.10 30.10 30.01 30.11 29.93	1.076 1.010 1.083 1.083 1.048 1.065 1.040 1.080 1.057 1.067	52% 100% 43% 41% 100% 45% 55% 55% 54%	Overcast Broken Clouds Clear L. Rain, Overcast Clear Broken Clouds Overcast Scattered Clouds Overcast Overcast

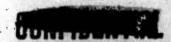




te: 7 Mar. 1950

100 fards

TIME	ANNUNITION TYPE	RD.	STRIKE (REF. TO FUEL LEVEL)	ENTRANCE HOLE	EXIT HOLE	SIZE OF FLASH INCHES	IGNITION	REMARKS
1317 1330	us uk	1 2						Locator Locator
			W/O Plate -	Below Fue	l Lovel	i I		
1332	us	3	2-1/2" Below	•30	.30	1x16	No	Flash visible behind can only.
1338	UK	4	7" Below	.280	1/2"	None	No	V
13/14	US	. 5	6" Below	.30	1/2"	6"	No	Flash was
}					·	-		approx. 8 ft. behind can.
1350	UK	6	10" Below	.280	.280	2"	No	Flash visible at rear of can
1357	US	7	7" Below	.30	.30	6"	No	Flash not
								visible until approx. 7 ft. behind can.
1705	UK	8	8" Below	.280	1/2"	None	No	
1410	US	9	9" Below	•30	1/2"	None	No	
1415	UK	10	5" Below	.280	.280	None	No	
1422	US	11	10" Below	.30	.30	5 "	No	Flash not visible until approx. 30 ft. behind target.
1430	UK :	13	6" Below	.280	.280	None	No	
			W/O Plate -	Above Fue	l Level			
1450	US	13	1/2" Above	.30	.30	5"	No	Flash approx. 8 ft. behind can.
1452	UK	14	On Fuel Level	.280	.280	None	No	Unfair Hit.
11,55	US	15	7" Above	.30	.30	10"	No	Flash 4 ft.
				• ,,	• , , •			behind can.
1459	UK	16	8" Above	.280	1/2"	12"	No	Strike was on
					i delete			top seam of
10								showed on face
-			TO SECOND					of can.
9.50				March Co.		ml.		



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e é		址	100	Appendix O	-		A. Carry	A.
TIME	Aldunitica Type	RD.	STRIKE (REF. TO FUEL LEVEL	ENTRANCE HOLE	EXIT	SIZE OF FLASH INCHES	IGNITION	REMARKS
1500	us	17	6" Above	.30	•30	6°	No	Flash 3 ft.
1502 1504	UK US	18 19	6" Above	•30	.30	8"	No	behind can. Disregard. Flash / ft. behind can.
1506	UK	50	5" Above	.280	.280	None	No	
1507	US	21	6" Above	.30	.30	8"	No	Flash 2 ft. behind can.
1509	UK	22	5" Above	.280	.280	None	No	
	(Follo	wing t	wo rounds fi	red to repla	ce roun	ds 14 and 3	18)	
1511	UK	23	5" Above	.280	.280	5"	Yés	Disregard strike was on edge of can.
1515	UK	24	4" Above	.280	.280	None	· No	cage or can.
1517	UK	25	hu ypone	.280	.280	None	No	
			Date: 8	Nar. 1950				
1015	us	1	19.2					Locator
1016	UK	2	- OF -					Locator
		1,	/2" between	plate and car	n.			- 6
•			W/Plate -	Below Fuel L	evel			
1020	. US	3	4" Below	3/4"	3/4"	10"	No	Flash visible on both sides of can.
1030	UK	4	4" Below	1/2"	3/4"	Lost	Yes	Flash visible
400						• 5		in front of can only.
		(e, s,	olgan de		1 1/4	40.00		Flash smudge on face of
1070			40 Palam	1/2"	1 ⁿ -	011	No	plate. Flash visible
1032	US	·:- 5	6" Below	1/6			NO	in rear of can
		THE SHALL	Vernilla (V					only, Approx. 2" from surface
			4					of can.
7 1			1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	V		ACT 271 - 2 2-34		



TIME	AMMUNITION TYPE	RD.	STRIKE (REF. TO FUEL LEVEL	ENTRANCE HOLE	EXIT HOLE	SIZE OF FLASH INCHES	<u>IGNITION</u>	REMARKS
1040	UK	6	3" Below	3/4"	3/4"	18"	Yes	Flash visible on both sides of can.
1042	US	7	7" Below	1/2"	1-1/4"	1/2"	No	Flash visible only between plate and can very small.
1046	UK	8	3" Below	1/2"	1/2"	4"	Yes	Flash visible on face of plate and between plate
1050	US	9	5" Below	1/2"	3/4"	8"	No	and can. Flash visible about 4" behind can.
1055	UK	10	h" Below	1/2"	1/2"	7"	Yes	Flash visible in front of plate.
1105	us	11	6" Below	1/2"	3/4"	10".	No	Small flash visible on face of plate. Ten-inch flash visible 18" in
1110	Uk .	12	3" Below	1/2"	1/2"	4 "	No	rear of can. Flash visible on face of plate and be- tween plate and can.

Note: Generally UK ammunition appeared to flash mostly on face of plate and between plate and can; US ammunition appeared to flash behind can mostly. One round of US gave visible flash between plate and can.

1/2" between plate and can

W/Plate - Above Fuel Level

6" Above 1/2" 1" 6" No

Comment of

Flash visible at rear of can only.

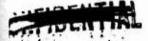


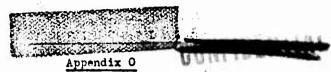
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			=			V.		
TIME	APMUNITION TYPE	RD.	STRIKE (REF. TO FUEL LEVEL)	ENTRANCE- HOLE	EXIT	SIZE OF FLASH INCHES	IGNITION	REMARKS
1025	UK.	14	10" Above	1/2"	3/4"	ŗ"	No	Flash appeared to be only on
1130	US	15	2" Above	3/4"	1"	10"	No	face of plate Flash behind can only, approx. 1 ft.
1132	UK	16	∐ [™] Above	1/2"	1/2"	6 "	Yes	from can. Can ignited but blaze burned only momentarily. Flash was visible on
			2					face of plate and in rear of can. Large
1135	US	17	7" Above	3/4"	1"	12"	No	smudge on face of can. Small flash visible on face of can.
		. \$	S. 128					Main flash was approx. 1 ft. from
1140	. UK	18	5" Above	1/2"	3/4"	12"	No	can. Main part of flash on face of plate. Small pencil of flash in
1145	US .	19	5" Above	1"		12"	No	rear of can. Small flash visible on face of can. Main part of flash was
				OUNT 13	-11-			approx. 1 ft. from rear of can.
			AND ALL DOCUMENTS	TOWNS TOWNS TO SERVICE THE PERSON OF THE PER	2322			



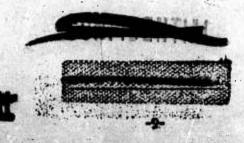




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TIME	AMMUNITION TYPE	RD.	STRIKE (REF. TO FUEL LEVEL)	ENTRANCE HOLE	EXIT HOLE	SIZE OF FLASH INCHES	IGNITION	REMARKS
1146	UK	. 20	5" Above	1/2"	1/2"	10"	Yes	Large flash on front of plate and in rear of can. Bullet appear- ed to break up inside can making two exit holes.
1245	us	21	6" Above	3/4"	3/4"	8"	Yes	Flash visible about 4" behind can.
1250	UK	22	5" Above	1/2"	1/2"	12"	No	Large flash smudge on face
	÷				E .		¥	of can. Flash was visible on both sides of can and on face of plate.
			4" between pl W/Plate - Bel					·
1255	US	23	L™ Below	1"	3"	-	Yes	Flash was visible between plate and can. Fire prevented estimate of
1300	UK	වා.	3" Below	1"	1/2"		Yes	size (flash). Disregard - double hit. Flash visible between plate and can and on face of plate. Bullet struck previous hole
1305	US	25	2 ^N Below	34"	1-1/4"	5" Ł	No	in plate. Flash visible between plate and can, appeared to be 5" in diameter.

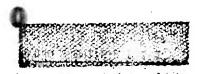
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į			M .	•		-			
				STRIKE			SIZE OF	2 2 2 2 7	
		AMMUNITION		(REF. TO	ENTRANCE	EXIT	FLASH		
	TIME	TYPE	NO.	FUEL LEVEL)	HOLE	HOLE	INCHES	IGNITION	REMARKS
	1310	UK	26	3" Below	3/4"	1/2*	•	Yes	Flash occurred on face of plate and between plate and can.
	1315	~ ∙ US	27	2 ^m Below	1/2"	1"	•	No -	Flash between plate and can. Large flash smudge, on face of can.
	1320	us	28	3" Below	1/2*	1/2"	•	No	Flash visible on face of plate and between plate and can. Large flash smudge on face of can.
	1326	US	29	1" Below	1/2"	1-1/4"	3"	No ·	Flash visible be- tween plate and can.
	1350	UK	30	3 ⁿ Below	1/2"	1/2"	-	No	Flash on face of plate and between plate and can. Flash on face of
								• • **	plate 3"; behind plate 3".
	1355	us	31	2" Below	1/2"	2"		Yes	Flash between plate and can, none in rear.
	3F'00	UK	. 32	3" Below	3/4"	1/2"	-	No _.	Flash mostly be- tween plate and can, appeared to be about h* in diameter. Flash smudge around en- trance hole in can.
	14:05	UK	33	3" Below	3/4"	1/2"	-11	Yes	Flash between plate and can.



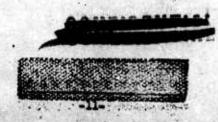
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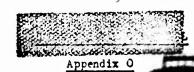
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TIVE	ALP:UNITION TYPE	RD.	STRIKE (REF. TO FUEL LEVEL)	ENTRANCE HOLE	EXIT	SIZE OF FLASH INCHES	IGNITION	REMARKS
10.00	O. W. Ja		li betwee	en plate and	d can		1.0	
			•	Above Fue				
			11/11208	ADOVA Pue.	T DOART			
1415	US	34						Disregard, hit
								seam of can.
1420	UK	35 -	3" Above	1/2"	1/2"		Yes	Flash between
								plate and can.
								Flash smudge on face of can.
								Two small exit
								holes in can.
1421	US	36	4" Above	1/2"	3/4"		Yes	Flash between
	•	•			•		•	plate and can,
								none in rear of
								can. Flash
								smudge on face
								of can. Ignition
						•		occurred very
								slowly.
1423	UK	37	L" Above	1/2"	1/2"		Yes	Flash on face
								of plate and
								face of can.
								Smudge on face
								of can.
	. 1							Projectile appeared to
								break up in can
						•		making two exit
_ =			112.7					holes.
1425	US	38	5" Above	3/4"	1"		Yes	Flash between
								plate and can.
								Smudge on face
1427	UK	39	L" Above	1/2"			No	of can. Flash between
arte l	VA.	77	4 80010	-/-		6. 1	NO	plate and can.
								Large smudge on
								can. Two small
						Sec.		exit holes in
			THE PARTY OF THE P		MARCHI			can.



			Constitution of the second	Cer. Comment	1		•	
	, , , , , , , , , , , , , , , , , , , ,			Appendix (1 - grisantalisag	Prof. Paris
TIME	AMMUNITI TYPE	ON RD.	STRIKE (REF. TO FUEL LEVEL	ENTPANO HOLE	E EXIT	SIZE OF FLASH	IGNIT	ION REVARKS
- 6-1432 E		A 40	4" Above	1/2"	1"		Yes	Flash smudge
1		ME.	•					on face of can. Flash between plate and can.
1439	UK	41	It Above	1/2"	1/2"		Yes	none in rear. Flash between
			*					plate and can. Large smudge on face of can. Two small exit
1141	US	142	4" Above	1/2"	1"		No	holes in can. Flash between
i de la companya de l	•							plate and can with small
		· ·				•		streak visible behind can.
1145	UK	43	il ⁿ Above	1/2"	1/2*	8	Yes	Flash smudge on face of can. Large flash smudge on face of can. Flash between plate
Political Control of the Control of		Followin	ng round fire	d to replac	e round 3	ŊŤ.		and can.
1447	US	Η	4" Above	1/2"	3/4"		Yes	Flash between plate and can,
	٠		8" beta W/Plate	veen plate - Below F	and can uel Level	:		none in rear.
150 6	US	45	2" Below	3,24"	1-1/2"	4 "	No	Flash smudge on face of can, no flash in
1510	UK	46	3" Below	1/2"	1"	6"	No	rear of can. Flash between
					ALM I	40		plate-and can Smudge on face
				The Act				of can.
				wasti southerday	and the state of the later of t	1		



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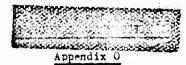


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TIME	AMMUNITION TYPE	RD.	(REF. TO FUEL LEVEL)	ENTRANCE HOLE	HOLE	FLASH INCHES	IGNITION	REMARKS
1520	us	47	2 ⁿ Below	1/2"	1-1/2"	6"	No	Small flash on face of plate. Large flash smudge on face of can.
1525	UK	48	i, [™] Below	. 0	1/2"		No	Flash filled space between plate and can with respect to length. Flash also visible on face of plate. Two entrance holes in can.
			Date:	9 Warch 195	0			
1010	us ∸	1	7" Below	1/2"	1-1/2"	7 ⁿ _	No	Flash visible between plate and can, none
1015	UK .	2	11" Below	1 1	1/2"	<u></u>	Yes	in rear of can. Flash visible on face of plate and between plate and can. Two
								entrance holes in can.
1020	US	3	7" Below	1/2"	2",	6 "	No	Flash visible between plate and can. Large flash smudge
1029	UK	L	10" Below	1/2"	3/4"	6*	No	on face of can. Flash between
1027	UK.	4	TO DATOM	1/2	2/4	3	NO	plate and can.
								Large flash smudge on face
				1000				of can.

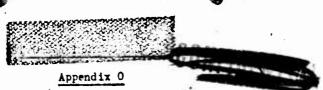


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TIVE	AMMUNITION TYPE	RD.	STRIKE (REF. TO FUEL LEVEL)	ENTRANCE HOLE	EXIT HOLE	SIZE OF FLASH INCHES	1ch i lion	REMARKS
1039	us	5	6" Below	3/ L "	1-1/2"	F.	No	No flash on face of plate. Large flash. smudge on face of can. Flash visible between plate and can.
10145	UK	6	8 ^m Below	1/2*	1"	-	Yes	No flash on front of plate. Flash visible between plate and can.
	•		8" bets W/Plate	ween plate s - Above Fu	ind can iel Level		÷.	
1102	us .	7	3" Above	1/2"	1-1/4"	li"	Хo	Flash only between plate and can. Smudge
1104	UK	8	L" Above	1/2"	1/2"	-	Yes	on can. Small flash on face of plate. Approx. 3" flash between
1107	UŞ	9	3" Above	3/4"	1-1/4"	-	Yes	plate and can. Flash between plate and can
1109	UK	10	3" Above	1/2"	3/4"	3**	No	only. Flash on face of plate and between plate and can. Small flash smudge on
1111	US	11	3" Above	1/2"	1-1/2"	6"	No	face of can. Flash between plate and can only. Large flash smudge on
1115	UK	12.	7. Vpose	1/2"	3/4"	5 "	No	face of can. Flash between

plate and can. Large flash smudge on face of can.

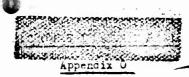


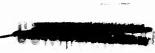
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TIME	ADDUNITION TYPE	RD.	(RE	TRIKE P.TO L LEVEL)	ENTRANCE HOLE	HOLE	SIZE OF FLASH INCHES	IGNITION	REMARKS
1115	US	13	1," 1	l bove	1/2"	1-1/4"	7"	No	Flash visible between plate and can only.
1119	UK .	Л ¹	3" /	Above	1/2"	1/2"	7*	No	Approx. 3" flash on face of plate, 7" flash between plate and can.
1121	US	15	5" 4	/pove	1"	2 "	8 "	Yes	Flash between plate and can only.
1129	UK	16	5" /	Nbov e	1/2"	1/2"	8 ⁷¹	No	Small flash on face of plate, 8" flash between plate and can. Large flash smudge on face of can.
					ween plate a - Below Fu		=		
1129	US	17	4" 1	Below	1"	2"	6 "	No	Flash between plate and can only. Medium sized flash smudge on face
1138	UK.	18	3" 1	Below	1/2"	1"	-	Yes	of can. Small flash on
1255	US	19	Ĺ" 1	Below	3/lı"	e Ger	10"	No	face of plate. Flash between plate and can only. Large flash smudge on face of can. Two 1" exit holes.
1304	UK	20	3" E	Selow		1"	• 1	Yes	Two small entrance holes. Main part of flash between
1309. RBME	US .	21	3° 1	lelow	1/1		76.	No.	plate and can. Two exit holes. Flash only between plate and can. Large
1,4415	N. A. A.				-11 ₄ -		Margaret	ll bank	lash smudge on ace of plate.



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THE	ATMUNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	EXIT HOLE	SIZE OF FLASH INCHES	IGNITION	REMARKS
1315	ue	22	2" Below	1/2"	3/4"	10"	Yes	Small flash on. face of plate. Main part of flash between plate anc can.
1320	us	23	3 ^m Below	3/4"		10 "	No	Three exit holes in can. Large flash smudge on can. Flash only between plate and can.
1327	· UK	24	3" Below	1/2"	1,4	0	Yes	No flash on face of plate.
1335	us	25	3 ^M Below	-	1-1/2"	8 "	No	Two entrance holes. Flash between plate
								and can only. Large flash smudge on front of can.
1340	UK	26	Ų [™] Below	=	1"	-	Yes	Two small entrance holes. Small flash on face of plate.
			12" he	tween plate	and can			race of places.
				e - Above Fu		-		
1350	US	27	3" Above	3/4"	1"	6 "	No	Flash visible between plate and can. Large flash smudge on face of can.
	1			•				One small fragment made additional exit hole.
1354	UK	28	f. VpoAe	N Par	3/4"	Ľ	Yes	Two entrance holes. Flash visible on face of plate.
109			S. The		Merica.			and or preses







TIME	AVMUNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	EXIT HOLE	SIZE OF FLASH INCHES	IGNITION	RETARKS
1358	us	29	3" Above	3/4"	1-1/4"	10"	No	Flash between plate and can. Large smudge on face of can.
1400	UK	30	Ų ^m Above	-	***	10 ⁿ	No	7" flash on face of plate. Slight smudge on face of can.
1402	us	31	5" Above	3/4"	1-1/2"	10 ^m	No	Flash between plate and can. Large smudge on face of can.
1405	UK	32	μ" Above	1/2 ⁿ	1"	•	No .	3" flash on face of plate, 7" flash between plate and can. Very slight smudge on face of can.
11:10	us	33	Tu YpoAe	3/4"	1-1/4"	10"	No	Flash between plate and can. Large smudge on face of can.
1455	UK	34	3" Above	.280	.280	6 <u>"</u>	No	3" flash on face of plate. Slight flash smudge on face of can.
1500	US	35	3" Above	3/4"	1-1/2"	10"	No	Flash visible between plate and can only. Large flash smudge on face of can.
1503	UK	36	4" Above	3/2°	1/2"	6 "	No	Flash on face of plate. Flash appeared to be on rear of plate barely reaching can. Very slight smudge
								on face of can.





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	A		L	•				A .	"-
AND THE	-	44.4	•	STRIKE	W		SIZE OF		
	APPIUNITION	RD.		EF.TO	ENTRANCE	EXIT	FLASH		
TIME	TYFE	NO.		er rever)	HOLE	HOLE	INCHES	IGNITION	REMARKS
			300 Y	ard - W/O	Plate - Rel	ow Fuel	Lovel		
				DATE:	10 March 1	950			
1110	us	1-10							Locators.
1115	UK	1-13							Locators.
1146	us	1	2"		•30	.30	None	No	
1155	UK	2	2,	Below	.280	.280	None	No	
1340	US	34	4"	Below	.30	.30	None	No	
13/15	UK	4		-	-	•	-	No	Unfair hit.
1346	US	5	2"	Below	•30	1/2"	None	No	
1356	UK	6		-	-	-	_	-	Unfair hit.
าโเด้ว	US	7		-	-	-	-	No	Unfair hit.
1406	UK	8		-	-	-	-		Missed can.
1410	US	9	2"	Below	.30	.30	8"	No	Flash visible
		,	_		- / -		_		in rear of can.
1421	UK	10	2"	Below	.280	1/2"	None	No	
1425	US	11		Below	.30	1/2"	8"	No	8" flash visible 6" to 8" behind can.
1436	UK	12	5"		.280	.280	None	No	
1450	. UK	13	6"	Below	.280	.280	None	No	
1500	UK	14		-	•	-	-	No	Missed can.
1502	UK	15		-	53/4	-		No	Unfair hit.
1505	UK .	16	3"	Below	.280	.280	None	, No	
			Gan III	W/O Pla	te - Above I	Fuel Lev	rel - Date	: 13 Mar. !	50
1115	US	1-3							Locators.
1130	UK	4-7							Locators.
1323	US	8		•	-	-			Hit top of can.
1325	US	9		Above	.30	.30	None	No	
1330	UK	10		Above	.280	.280	None	No	
1332	US	11	5"	Above	.30	.30	11"	No	Flash visible
				The state of the	3 3			6	in rear of can
						hys.	,		only, appeared to start from
1335	UK	12			V.Y. FERRIN	Division of			rear side of ca Missed can.
		4.		Water course	-	-	71		



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a		17.4		•

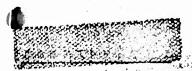
IME	A MUNITION TYPE	RD.	(R	STRIKE EF.TO L LEVEL)	ENTRANCE, HOLE	EXIT HOLE	SIZE OF FLASH INCHES	ignition	REMARKS
336	UK	13	2"	Above	. •260	.280	-	No	Very small streak of flash visible in rear
.338	us	14	7 "	Above	.30	.30	-	Yes	of can. Can ignited at exit hole. Streak of flash visible at rear of can.
3110	UK	15	3"	Above	.280	.280	None	No	
31,2	us	16		-	•	•	•		Missed can.
343	บร	17		_	•	-	-		Missed can.
1,18	บร	18	9"	Above	• 30	.30	None	No	
421	UK	19	ĺ۳	Above	.280	280	None	No - ·	
1,23	US	20	-	•		•	-		Unfair hit.
124	บร	21							Lissed can.
1,26	บร	55	7"	Above	30	.30	14"	No	Flash visible
100	00	to to	٠,		• ,,,	• , •			approx. 2'
									behind can.
128	UK	23		_	1-1			_	Unfair hit.
430	UK	24	5*	Above	.280	.280	None	No	
				1/2" be	etween plat - Below F	e and cuel Lev	ean rel		
148	us	25		•		-	-		Missed can.
150	US	26		-	-	-	-		Unfair hit,
_									top of can.
₁ 55	US	27		-	•	-	-		Unfair hit,
	***				a fatt	- A m			top of can.
500	US	28	3"	Below	1/2"	3/4"		No	Flash visible
									on face of
								· 51	plate. Large
				nd se					flash smudge on
		-							face of can.
510	UK	29 30	5"		000			20.00	Missed can.
511	UK	30	2	Below	.280	Lost		Yes	Flash visible
	4				02/11/2 3/25/		6.		on face of
					-	_	2		plate. Base of
	A STATE OF THE STA			1.1	The state of		35. 5.5		bullet jacket
						CHES SO	-		remained stuck
				The restant		-	1 The second		in plate.





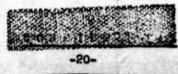
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	pendik U			and the
STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	EXIT HOLE	SIZE OF FLASH INCHES	IGNITION

		TL:	0.00 7777	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		SIZE OF		
TPE	APRIUNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	HOLE	FLASH INCHES	IGNITION	REMARKS
1516	US	31	Ļ [™] Below	1/2*	3/4"	-	No	J ^R flash visible on face of plate. Flash smudge on rear of plate and on face of can. Pieces of bullet jacket stuck in plate.
1520	UK	32	L ⁿ Below	• 280	.280	5"	No	Flash visible only on face of plate. Flash smudge on face of can. Base of bullet jacket stuck in plate.
			Date:	14 March 19	950			
1010 1025 1035	us uk us	1-8 9-10 11	l ^m Below	1/2"	3/4"	- "	No	Two inch flash visible on front of plate,
				****				none in rear of can. Flash smudge around entrance hole
1042 1045 1048 1051 1053	UK UK UK UK UK	12 13 14 15 16 17	Above Fuel	- 280	1/2"		No	in can. Missed can. Missed can. Missed can. Missed can. Unfair hit. L' flash
1059	UA.		- Below		<i>1/2</i>		NO	visible on face of plate. Flash smudge on face of can. Base of bullet jacket
1106	US	18	3" Below	.30	1/2"		Yes	stuck in plate. Two inch flash
	Barre							on face of plats

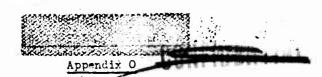


	Appendix 0	1	THE RESERVE
	نات		THE PERSON NAMED IN
2	2000		SIZE OF

y » { TI		TYPE	RD. NO.	STRIKE (REF.TO. FUEL LEVEL)	Entrance Hole	EXIT	SIZE OF FLASH INCHES	IGNITION	REMARKS
11	.U ₄	UK	19	3" Below	.280	1/2"	· -	Yes	Four inch flash on face of plate. Base of bullet jacket stuck in plate.
11	.20	US	20	Ц" Below	1/2"	3/4"	-	Yes	Small flash on face of plate. Piece of bullet jacket stuck in hole in plate.
11	2 6	UK	21	7 Apone	.280	1/2"	-	Yes	Four inch flash visible on face of plate. Pase of bullet jacket remained stuck in plate.
					tween plat - Above F				
11.	41	us	22	8" Above	1/2"	1/2"	 gi	No	Small flash on face of plate, none in rear of can. Flash smudge on face
11	l.l.	UK	23	8" Above	.280	.280	-	No	of can. Six inch flash on face of plate. Large flash smudge on face of can. Base of bullet jacket stuck in plate. No flash visible
					MARKE ASSESSED	energia.			in rear of can.







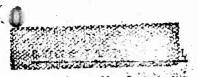
	- MIII		STRIKE			SIZE OF		
TIME	TYPE	RD.	(REF.TO FUEL LEVEL)	ENTRANCE HOLE	HOLE	FLASH INCHES	IGNITION	REMARKS
1247	us	24	7" Above	•30	.30	-	No	Three inch flash on face of plate. Lerge smudge on face of can.
								Base of bullet jacket stuck in plate.
1255	UK	25	-	-	-	-		Unfair hit on top of can.
1258	UK	26	•	-	-	•		Missed can.
1300	UK	27	-	-	•	-		Unfair hit on top of can.
1302	UK	28	7" Above	.280	.280	-	СИ	Four inch flash on face of plate
				•				Large flash
								smudge on face of can.
1305	US	29 -	-	, -	-	•		Unfair hit on
						•		top of can.
1307	us	30	3" Above	. 30	1/2"	-	No	Two inch flash on face of
					•			plate. Large
					-			flash smudge on face of can.
1310	UK	31				_	_	Unfair hit,
								top of can.
1312	UK	32	1" Above	.280	.280	•	No	Four inch flash on face of
					-			plate. Large
								smudge on can. Base of bullet
								jacket stuck in
				L. Vi				plate.
1315	US	33	3" Above	1/2"	3/4"	2011	Yes	Ignited at entrance hole,
								but burned only
					18			momentarily. Two inch flash
				المالية سومه	200			on face of
			400	LESBARMAN	Mark			plate, Large
):	- CHILING	-		3/3/3	flash smudge on
T WE								face of can.

Contractor						
	The	endix 0				
:	STRIKE		100000	SIZE OF	6 5.4	
-	TO TO	ENTRANCE	EXIT	FLASH		
172	LEVEL)	HOLE	HOLE	INCHES	IGNITION	REMARKS
		_		_		Missed can.
L"	Above	.280	280	-	No	Three inch
					177	flash on fac of plate. Large smudge on can. Base of bullet jacket stuck in plate.
3"	Above	1/2"	1/2"		Yes	Flash on fac of plate. Large flash
						smudge on fa
1"	Above	.280	1/2"	•	No	of can. Five inch flash on fac of plate.

1328	us	36	3" Above	1/2"	1/2"		Yes	of builet jacket stuck in plate. Flash on face
								of plate. Large flash smudge on face
1332	UK	37	1 ^m Above	.280	1/2"	•	No	of can. Five inch flash on face of plate. Large flash smudge on can.
			L" betw	reen plate	and can		:	
			W/Plate	- Below F	nel Level	L		
1352	us	38	2" Below	1/2"	1 ⁿ	-	No	(New plate) Three inch
							•	flash on face
				,				of plate. Large flash smudge on face
1400	UK	39	6" Below	1/2"	1/2"	•	Yes	of can. Three inch flash on face of plate.
1410	US	40	2" Below	1/2"	ĿĠ,	ē	No	Two inch flash on face of plate. Large
		3.1			3588			flash smudge
	w Po							on face of can. Two small exit holes in can.
1417	UK	. 41	7" Below	1/2"	3/4"		Yes	Four inch flash
1		1.		-	- 4.11	1		on face of /
	NO SHA	7.28-4. T	3/11-					

TIME

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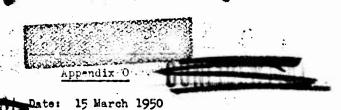
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				TRIKE	· contract	4921830	SIZE OF	-	
	AVAUNITION	RD.		EF.TO	ENTRANCE	EXIT	FLASH		
TIME	OTHELD	. FO.		EL LEVEL)	HOLE	HOLE	INCHES	IGNITION	REMARKS
11/22	WOLL THE	ngi i	19	Below	1/2"	3/4"	-	Yes	Four inch flash on face
1430	UK	43	9"	Below	1/2"	1/2"	-	Yes	of plate. Four inch flash on face of plate. Flash also visible
1177	***	11.	۲۳	Po l om	1/2"		· _	Yes	between plate and can. Base of bullet jacket stuck in plate. Two inch flash
1/437	US	1 <u>1</u> 14 	0	Below	1/2	•	•	178	on face of plate. Two
									exit holes in can, piece of bullet jacket stuck in plate.
1145	UK		5 "	Below	. 200	.280	-	Ю	Four inch flash on both sides of plate. Flash smudge on can. Base of bullet
					- 1	1			jacket remained
1452	us	79	5 "	Below	.30	1-1/4"	- 1	No	one inch flash on face of plate. Flash smudge on face
								<u>.</u>	of can. Flash also visible between plate and can.
1502	UK	47	7"	Below	.280	1/2"	-	No	Three inch
									flash on face of plate. Large
								ap.	flash smudge on face of can.
	An.					100 at -10 '100			Base of bullet jacket stuck in
	Minn	-			Uldi			***	plate. Flash
1	11.			Bush		THE TOTAL S			also visible between plate and can.
			500	Market Market				A CONTRACTOR	

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				18 6 18 8 5 7 3	
(REF.TO	ENTRANCE HOLE	EXIT HOLE	SIZE OF FLASH INCHES	IGNITION	

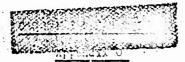
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TIME	NIVIE!	PD.	(REF.TO	ENTRANCE HOLE	HOLE	FLASH INCHES	IGNITION	RE'ARKS
			L" bet W/Plat	ween plate a e - Above Fu	nd can el Level			
1512	US	ц8	I" Above	1/2"	3/L"	-	No	One inch flash visible on face of plate; four inch flash between plate and can. Large flash smudge on face of can.
1516	UK	49	Т и ∀роле	. 280	.230	-	No	Four inch flash on face of plate; four inch flash between plate and can. Large
					•	3.		smudge on face of can.
1520	us	50	h, Vpone	•30	1/2"		No ·	Fumes at entrance hole in can appeared to burn for about 2 secs.,
								but not
		air 👛		*			,	sufficiently to be called
	·							ignition. Two inch flash on face of plate. Large flash smudge on face
				220	.280	- 4	No	of can. Four inch
1525	UK	51	5" Above	280		L		flash on face of plate; three inch flash between plate and can. Large smudge on can.
	150000	31-11	53.22	200	75.5			



			Mate:	15 March 19	20			
TIME	AMPUNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	EXIT	SIZE OF FLASH INCHES	IGNITION	REMARKS
0955	US	1-4						Locators.
1010	uk us	5 -9 10	6" Above	1/2"	1/2"	-	No	Flash visible on both sides of plate. Large flash
1012	UK	11	Ц ^п Above	.280	1/2"	-	No	smudge on can. Four inch flash on face of plate; flash also visible between plate and can. Large
								flash smudge on can. Base of jacket stuck in plate.
1015 1017	us us	13	6" Above	•30	1/2"		Yes	L'issed can. Two inch flash on face of plate, large flash between
•						en f		plate and can. (Can top was loosened before second rd.)
1020	UK	14	L" Above	.280	1/2"		No	Five inch flash on face of plate. Flash also visible between plate and can. Large
1023	us -	15		4.544				smudge on can. Unfair hit on
2665					. 68			top of can.
1025	US	16	3" Above	.30	1/2"		No	Flash visible on face of plate and between plate
Y III	He		E				be in	and can.



TIVE	and thing	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	EXIT	SIZE OF FLASH INCHES	IGNITION	REMARKS
1029	UK	17	The state of	.280	1/2"	-	Yes	Flash visible on face of plate and between plate and can. Flash smudge around entrance hole in can.
			8" betw	reen plate a - Below Fu	nd can	<u>1</u>		
1035 1036	US US	18 19	L ⁿ Below	1/2"	-		No	Missed can. Two small exit holes. Flash visible on face of plate and between plate and can. Flash
1014	UK	20	3" Below	. 280	1/2"	20	Yes	smudge on face of can. Can ignited
*****	•		,		Į.	1		rery slowly. Flash visible on both sides
1049	US	21	3" Below	1/2"	3/4"	-	No	of plate. Two inch flash and on face of plate, large
			à .		2	===	Ē	flash between plate and can. Large flash smudge on face
1056	UK	55				·		of can. Unfair hit on
1104	UX	23	7º below	1/2"	1/2"		Yes	top of can. Flash could not be observed because of
	en e			-26-				ignition.
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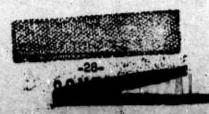


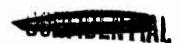
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THE THE	ТУРЕ	NO.	STRIKE F.TO FUEL LEVEL)	ENTRANCE FOLE	EXIT	SIZE OF FLASH INCHES	IGNITION	RE'ARKS
1108	us	511	4" Below	1/2"	1"	•	No	Two inch flash on face of plate. Large flash between plate and can. Flash smudge on can.
1115	UK	25	8" Below	.280	1/2"	-	Но	Large flash on face of plate and between plate and can. Very slight flash smudge on can. Pase of bullet jacket stuck
1121	us	26	3 ^H Below	1/2*	3/4"	<u>-</u>	No	in plate Two inch flash on face of plate. Large flash between plate and can. Large flash
1129	UK	27	8" Below	.280	1/2"		No	Four inch flash on face of plate. Good
		. 25				`		flash visible between plate and can. No flash smudge
1136	us	28						on face of can. Unfair hit on
1142	US	29	L" Below	1/2"	3/4"		No	Two inch flash on face of plate. Good
						3		flash between plate and can. Flash smudge on face of can.
	lo alles as							1 1945 A

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THE 1146	APPUPITION TYPE	RD. NO. 30	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE 1/2"	SIZE OF FLASH HOLE JNCHES	IGHITION No	REMARKS Four inch flash on face of plate. Good flash smudge on face of can.
	. •		8" betw	een plate_a	nd can		
1255	us	31	W/Plate	- Above Fu	3/ 4 "	Yes	Ignition, but burned only about 5 secs. Flash visible on both sides
1258 1302	UK UK	32 33	l ^m Above	1/2"	3/4"	No	of plate. Smudge on can. Missed can. Unfair hit, below fuel level. Flash on both sides of plate.
1310	us	35	3" Above	1 ^m	1/2" -	No	Slight flash smudge on face of can. Flash visible on both sides of plate. Large
		26		3 16 26			flash smudge on face of can. Unfair hit, below fuel level
1317	UK	36 37	5" Above	1/2"	3 / 4" -	No .	Small flash on face of plate, good flash between plate and can. Small
	*	· ; t	#				flash smudge on can.







TIIE.	AMPUNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE POLE	EXIT	SIZE OF FLASH INCHES	IGNITION	REMARKS
1325	us	38	3" Above	1/2"		•	No	Fimes appeared to ignite at entrance hole giving a flash of flame, which expired instantly. Not considered as ignition. Good flash and large smudge on can.
1330	UK	39	Ļ ⁿ Above	.280	1/2"	. -	No	Flash on both sides of plate. Small flash smudge of face of can.
1332	US	40	S _n Apove	.30	1/2"	1	No	Flash on both sides of plate. Very large flash smudge on face of can.
1335	UK	41	4" Above	.280	.280		No .	Five inch flash on face of plate. Good flash between plate and can. Slight flash smudge on face
1338	US -	<u>l</u> 42	3" Above	in the second		e In	Yes	of can. Two 1/2" entrance and exit holes. Small flash on face of plate. Flash smudge on can.
1341	UK	43	3" Above	.280	1/2"		No	Four inch flash on face of plate. Small flash smudge on face of can'.

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TIVE	A TRUNITION TYPE	RD.		STRIKE EF.TO EL LEVEL)	ENTRANCE HOLE	EXIT	SIZE OF FLASH INCHES	IGNITION	REMARKS
				12" bet	ween plate - Below Fr	and can	,		
1350	US	144	7"	Below	1/2"	1-1/li"		Ко	(New plate). Flash on both sides of plate. Slight flash smudge on face of can.
1355	UK	. 45	5"	Below	1/2"	3/4"	-	Yes	Good ignition could not
									determine flash and smudge characteristics
11.03	US	46		-	· 🗖	-	-		Missed can.
1707.	US	47	9"	Below	3/4"	1-1/4"	•	No	Flash on both
									sides of plate. Very slight flash smudge
						.2			on face of can.
1411	UK	48	9"	Below	1/2"	3/4"	-	Yes	Ignition occurred
								*	slowly. Good
					Dok 1979	-2057-3			flash visible
						3.			on both sides
						4			of plate. Base of jacket
1417	us	49	9"	Below	3/4 ⁿ	1"		No	stuck in plate. Good flash on
		2		1000	Žbe.				both sides of
	- 10 1 1								plate. Small
					2012				egbums dasil
1426	UK	50	5"	Below	.280	1/2"	1/2/2017	No	on face of can.
					Termine's				flach on face .
		mar -					No. of the last	A 72	of plate, large
				1.11	UIIII .		•		flash between plate and can. Slight smudge on can. Base of jacket stuck
	The state of the s			G0159608568	*****				in plate.
305500	and the same of the same of	3 mm - 2 3 1		Want 50 20	* NA990 3846	Right Ball			

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Tive	TYPE	The second	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	EXIT	SIZE OF FLASH INCHES	IGNITION	REMARKS
1505	us	51	8 ⁿ Below	1".	1"		No	Two inch flash on face of plate. Good flash between can and plate. Small flash smudge on face of can.
1515	UK	52	8" Below	1/2"	3/4"		Yes	Good ignition. Could not determine flash and smudge characteristics
1517	us	53	8" Below	1 "	3/4"		No	Three inch flash on face of plate. Flash between
								plate and can did not appear to reach can,
-			• 11					although can did have slight flash smudge on face.
1525	UK	54	7" Below	3/4"	1"		No	Five inch
	9							flash on face of plate. Short flash
					•			between plate
· .		14		* ~	÷.			and can. No flash smudge around
								entrance hole in can.
	tally-		Total State	T.	18 2 T			







			# DONNERSONAL	- Parking			
TIME	AMMUNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	HOLE	SIZE OF FLASH INCHES	16NITICN
			Date:	16 March 19	50		
1027 1035 1041	us uk us	1-5 6-9 10	-	-		_	\$1
10/13	US	11	6" Above	-	1"	-	No
1045	UK	12	-	-	•	-	
1047	UK	13	7" Above	1/2"	3/4"		Yes
1049	us	14	7" Above	3/4"	•	-	No
			~				
1052 1053	UK	15 16	7" Above	1/2"	ī"	:	No
1056	us	17	7" Above	1/2"	1-1/4"		No
41	The state of					er.	
1058	UK	18	6" Above	.280	1/2"	ML/	y No
		1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3	661-00000		EN PUZZA		

RE'ARKS

Unfair hit on top of can. Flash on both sides of plate. Small flash smudge on face of can. Two 1/2" entrance holes in can. Double hit on

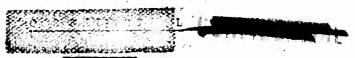
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of can.

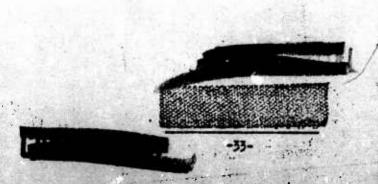
Small flash on face of plate, good flash between plate and can. Good flash smudge on face of can.
Two inch flash on face of plat Slight flash smudge on can. Base of jacket stuck in plate.

Flash on both sides of plate, Base of jacket stuck in plate. Flash on both sides of plate. Small flash smudge on face of can. Three small exit holes in can. Missed can. Flash on both sides of plate. Very faint flas smudge on face





TIME	Ammunition Tyfe	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	EXIT	SIZE OF FLASH INCHES	IGNI T ION	PE 'ARKS
					1"			
1101	US	19	6" Above	1/2"	1" 		No	One inch flash on face of plate. Small flash smudge
1103	UK	20	6" Above	1/2"	3/4"		No	on face of can. Large flash on both sides of plate. Small flash smudge on can. Base
								of jacket
1105	US	21	7 _n VpoAe	1"	1"		No	one inch flash on face of
			•		~			plate. Large flash smudge on face of can.
1107 1109	UK UK	22 23	5" Above	- •280	-280	-	No	Missed can. Flash visible
1109	UR	2)	-		*200	(e) a-		on both sides of plate. Slight flash smudge on face
				-1	4 -		·	of can. Base
		*,	*		4			of jacket stuck in plate.
				ds Range plate and d low Fuel Le				
1322 1335		4-32 3-36	(Good flash					Locators.
1343	us	37	3" Below	.30	3/4"	None	No	(New plate) No visible flash on face
				1.				of plate or on

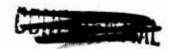


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outside of can. Large section

of jacket remained stuck in plate. No flash

smudge on can.







TIME	APTUNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	EXIT	SIZE OF FLASH INCHES	IGNITION	REMARKS
1350 1351	UK UK	38 39	5" Below	.280	.280	-	No	Missed can. Four inch flash on face
1400	us	40	L [™] Below-	.30	3/4"	None	No	of can. Small flash smudge on face of can No visible
	per.	-		ŕ				flash. No smudge on plate or can, section of jacket stuck
1408	UK	41	10" Below	. 280	.290	. 1	No	in plate. Six inch flash on face of plate. Small flash smudge
1415	u s	1,2	8 ⁿ Below	-30	3/4"	None	No	on can. No visible flash. No smudge on
								plate or can. Section of jacket stuck in plate.
1422	UK	43	7" Below	.280	.280	•	Yes	Three inch flash on face of plate.
1443 1443	us us	14 14	5" Below	•30	1-1/4"	None	No	Unfair hit. No visible flash. No flash smudge on can. Section
				4				of jacket stuck in plate.

A check disclosed that gunner had inadvertently fired wrong type of ammunition (US type) at cans for 500 yard range. One carton of AP, Lot FAX30-1357, had been put in box containing US, API ammunition, Lot FAX 30-1356. Carton containing wrong type of ammunition was not opened until after locating at 500 yards.

Following US rounds were fired to even up No. of cans for both types of

amminition:







<u> </u>	AMBUNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	EXIT	SIZE OF FLASH INCHES	IGNITION	PETARKS
0 3	us us	45 46	5" Below	1/2"	3/4"	-	No	Missed can. 5" flash on face of plate. Large smudge
o	US	47	2" Below	.30	1/2"	-	No	on can. Four inch flash on front of plate. Slight flash smudge on face of can.
5	US	148	9 ⁿ Below	1/2"	3/4"		No	Three inch flash on face of plate. Small flash smudge on face of can.
	43		Administration of the control	No of			ach tune	
	Above three		fired to eve	n up No. of	cans f	ired with e	each type	
1			fired to eve	n up No. of	cans f:	ired with e	No	Five inch flash on face of plate. Large flash smudge on face
Ļ	of ammunit	tion.				ired with e		flash on face of plate. Large flash
1	of ammunit	tion.				ired with e		flash on face of plate. Large flash smudge on face of can. Missed can. Four inch flash on face
5	of ammunitus US UK UK	50 51	5" Below	1/2"	1"	ired with e	No	flash on face of plate. Large flash smudge on face of can. Missed can. Four inch flash on face of plate.
5 9	of ammunit	50 51	5" Below	1/2"	1"	ired with e	No	flash on face of plate. Large flash smudge on face of can. Missed can. Four inch flash on face
5	of ammunitus UK UK UK US US US US US	50 51	5" Below	1/2" -280	1"	red with e	No Yes	flash on face of plate. Large flash smudge on face of can. Missed can. Four inch flash on face of plate. Missed can. Missed can. Missed can.
6 9	of ammunitus US UK UK UK US	50 51	5" Below	1/2"	1"	red with e	No	flash on face of plate. Large flash smudge on face of can. Missed can. Four inch flash on face of plate. Missed can. Missed can. Missed can. Five inch flash on face of
5	of ammunitus UK UK UK US US US US US	50 51	5" Below	1/2" -280	1"	red with e	No Yes	flash on face of plate. Large flash smudge on face of can. Missed can. Four inch flash on face of plate. Missed can. Missed can. Missed can. Five inch flas





AMUNITION TYPE

RD.

STRIKE (REF.TO FUEL LEVEL)

ENTRANCE EXIT HOLE

SIZE OF FLASH INCHES

IGNITION

RFMARKS

Note: Jacket of UK round appears to be breaking up on face of plate, only core seems to go through. Entire bullet appears to go through plate on US round.

Flash smudge on face of plate is large with UK round, but is very faint with US round.

Date: 17 March 1950

1/2" between plate and can W/Plate - Above Fuel Level

0945	US	1-3							Locators.
0950	UK	4-13							
1002	us	14		-	-	-	-		Mi sed can.
1003	US	15		-	-	-	- 7		Missed can.
1004	us	16	8"	Above	.30	.30		No	Three inch
									flash on face
	ment .				•				of plate. Small
									smudge on can.
1006	UK	17		-	-	-	- "	-	Missed can.
1007	UK	18	9"	Above	.280	.280	-	No	Five inch flash
									on face of
									plate. Small
									smudge on can.
1009	US	19**	7"	Above	.30	.30		NO	Three inch
									flash on face
	•				~ .				of plate.
									Large flash
									smudge on can.
1012	UK	20		•	-	•	• '	-	Missed can.
1013	UK	21	4"	above	.280	.280		No	Four inch
_									flash on face
									of plate.
		200							Large flash
	100								smudge on can.
	US	22	5"	Above	.30	1/2"		No	Three inch
		Variation .				-,			flash on face
	puppings for the	4			W 25	100			of plate. Large
				ALC: N					flash smudge on
				2		2 2			can.
1017	UK	23					+ St.o.	-	Unfair hit.
1020	ÜK	54 54					F 196 V/9	-	Missed can.
1022	UK	25					1/4 1/1/200		Unfair hit,
	Mary proposition of	45		-		25.50		1	below fuel
1.7	LANGE THE PARTY OF			100	1	20.75	CANAL TA		
1000	ASSESSED FOR	9,000-1000	15	Variable (Section)		A	ENLY LIST		Harris Villa III and III

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•	U		e: 755		
		Appendix O		•	
	 STRIKE	ENMD A NOTE	CY IM	SIZE OF	

100			=				The state of the s	M
- Andrews			STRIKE			SIZE OF		
	AMMUNITION	RD.	(REF.TO	ENTRANCE	EXIT	FIASH	TOUTOTOU	n-mu nen
TIME	TYPE	NO.	FUEL LEVEL)	HOLE	HOLE	THOHES	IGNITION	REMARES
1027	UK	26	4" Above	.280	.280	-	No	Four inch
•				•				flash on face
								of plate.
								Small flash
			•					smudge on can.
1030	US	27	- ,		-	-	-	Missed can.
1031	us	28	-	•	-	-	-	Missed can.
1032	US	29	•	-	-	-	-	Missed can.
1033	us	30	-11 44	-	3/4"	-	No.	Missed can. Three inch
1034	US	31	5" Above	.30	3/4"	-	NO	flash on face
								of plate.
								Large smudge
								on can.
1036	UK	32	2" Above	.280	.280	=	No	Five inch
1030	UK	25	S VOOA4	.200	•200	_	.10	flash on face
								of plate.
					,		*	Small smudge
								on can.
1038	US	33	7" Above	.30	1"		No	On e inch
10,0	•••	"	,		-			flash on face
								of plate.
				482				Large smudge
						•		on can.
1040	UK	34	• "	- 1	-	•	-	Missed can.
1041	UK	35	9" Above	.280	.280		No	Five inch
				2			•	flash on face
								of plate. Small
•								smudge on can.
			L" betw	een plate a	nd can			
				- Below Fu				
1047	US	36	8" Below	1/2"	3/4"	•	Yes	(New plate)
								Five inch flash
								on face of plate
•				411	Mary Tree			Base and piece
								of jacket
								crushed into
30000		1.059			White to			hole in plate.
1052	UK	-37				**	1 - V	Unfair hit on
	Maria Carlo	100	ENG THE				1	top of can.
1057	UK	38	acceptate state			September 1		Missed can.
			CA				Donald Street	
N. T. Ball				SAME TO	LAL	No.	N. Carlotte	

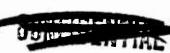
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	1		STRIKE		NAME OF TAXABLE PARTY.	SIZE OF		
TILE	APPUNITION TYPE	RD.	(REF.TO FUEL LEVEL)	ENTRANCE HOLE	HOLE	FLASH INCHES	IGNITION	REMARKS
1058	UK	39	7" Below	.280	1/2"		Yes	Three inch flash on face of plate. Base of jacket stuck in plate,
1103	us	40	3" Below	1/2*	3/4"	-	No	Four inch flash on face of plate. Large smudge on can. No pieces of jacket in plate
1114 1115	UK UK	41 12	5" Below	•280	1/2"	:	- No	Missed can. Five inch flash on face of plate. Small smudge on can,
		•			Ì			jacket apparently shattered on face of plate.
1119	us us	144 144	L" Below	.30	3/4"		No	Missed can. Four inch flash on face of plate. Large smudge on can. No pieces of
1125	UX	L 5	7" Below	.280	.280		Yes	jacket in plats Five inch flash on front of plate. Jacket apparently shattered on face of plate.
1130	us	Ц 6	5" Below	.30	3/1,"	,, ,,	No .	Two inch flash on face of plate. Large smudge on can. No pieces of jacket in plate.
		THE	CON I	IDENT	AL			2 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)

,	11121			4 1 1 1 1 1 1 1	للقويدد	- TITLE	Simerogra	į.
TIME	A' MUNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRNACE HOLE	EXIT	SIZE OF FLASH INCHES	IGNITION	RE*ARKS
1135	UK	47	_	-	-	-	-	Missed can.
1136	UK	48	-	-	-	-	-	Missed can.
1137	UK	19	. •		-	-	-	Missed can.
1138	UK	50		-	1"	-	V-	Missed can. Four inch
1139	UK · .	51	10" Below	.280	1 "	-	No	flash on face of plate. Slight flash smudge on can jacket apparently
				,				shattered on plate.
1250	US	52	_	-	_	-	•	Nissed can.
. 1251	US	53	8" Below	.30	3/4"		Yes	Four inch flash on face of plate. No pieces of
								jacket stuck in plate.
1256	UK	54		• .	- (-	-	•	Missed can.
1258	UK	55	10" Below	.280	1/2"	-	Yes	Five inch flash on face of plate,
								jacket
		4).						apparently shattered on face of plate.
			4" between w/Plate - A					
1355	US	56		a sile			-	Missed can.
1307	บร	57			- 118		-	Missed can.
1308	US	57 58					700-	Missed can.
1309	US	59	3" above	.30	1/2		No	Two inch flash on face of plate. Large flash smudge on can.
ν				A ESIMES OF T				No jacket in
		£ .			0.993353	200		plate. /
1115		3.37	and the second	A STATE OF THE PARTY OF THE PAR	M-135			NA CALL



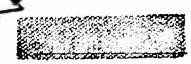


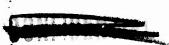


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TIME	AMMUNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	EXIT	SIZE OF FLASH INCHES	IGUITION	REMARKS
1311 1312 1314	UK UK UK	60 61 62	5" Above	.280	- - - 280	=	- No	Fissed can. Missed can. Three inch flash on face
	. ,			9				of plate, small smudge on can. Jacket apparently shattered on face of plate.
1316	US	63 64	17 42	-	1/2"	-	V-	Missed can.
1317	us	6/1	Γ _ω γρολο	.30	1/2"		No	Three inch flash on face of plate. Large flash smudge on can. No jacket
1320	UK	65	3" Above	.280	1/2"	-	No	pieces in plate. Five inch
				17-6				flash on face of plate. Small flash smudge on can. Jacket
				San A				apparently shattered on
1323	US	66	3" Above	.30	3/4"	- 30	Yes	face of plate. Can ignited at
1727	03	•) K0044	. ,00	5/4	Albert 8	100	entrance hole,
								fire burned for about 5
					4,			secs. and expired. Three-inch flash on
					V. Line			face of plate.
					· .			Large smudge on face of can.
1328	UK	67	L" Above	.280	1/2"		No.	Missed can. Four inch
-),,				200		111		flash on face
		ACTORY		Course		-12		of plate. /
	THE	ARTER S			7			on can.
		-						
	Manhala	44	Commissioners	STATE OF THE PARTY	-			

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Appendix 0

TPE	APPUNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	EXIT	SIZE OF FLASH INCHES	IGNITION	REMARKS
1332 1334	us us	69 70	L" Above	1/2"	:	-	No	Missed can. Two 1/2" exit holes. Three inch flash on face of plate. Large smudge on can. No jacket pieces
1336	uk .	71	- 3	•	-	-	-	in plate. Unfair hit,
								below fuel.
1342 1344	nk nk	72 73	2" Above	.280	1/2"	-	No	Four inch flash on face of plate. Small smudge
		۳.	=				· # *	on can. No pieces of jacket stuck in plate.
1345 1347	us us	74 75	2 ^m Above	.30	1/2"	-	- No	Missed can. Three inch flash on face of plate.
A.								Large flash smudge on can. Base of bullet jacket stuck in hole in
1352	UK	76				- 2		plate. Unfair hit,
1357	UK	77	SIEESTE.			1000		below fuel. Missed can.
1358	UK	78			13 451	100	17.33	Missed can.
1400	ÜK	79	L ⁿ Above	.280	1/2"	e s	No	Four inch flash on face of plate. Small smudge on face of can. No
	1,				The state of the s			pieces of
N	200							jacket stuck in plate.

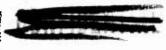


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			<u>wb</u>	pendix o	(C)	-	1 10	
TIME	APPUNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	HOLE	SIZE OF FLASH INCHES	IGNITION	REYAPKS
			8" betw W/Plate	een plate a - Below Fu	nd can el Level			
1408	us	80	9" Below	1/2"	1"	•	Yes	Ignition prevented observation of flash and smudge
1412	UK	81	8 ⁿ Below	•280	3/4"	-	Yes	characteristics Four inch flash on face of plate. Ignition appeared to occur after
11:18	US	82	2" Below	1/2"	1**		No .	flash. Three inch flash on face of plate. Large flash
1425	UK	83	-	•	-		-	smudge on can. Unfair hit on bottom of can.
11:30	nk	84	10" Below	.280	1/2"	181	Yes	Four inch flash on face
1435	US	85 -	3" Below	1/2"	1"		No	of plate. Three inch flash on face of plate. Large smudge
114,1	110	86		366		200	_	on can. Lissed can.
1/4/2	UK UK	87	8" Below	.280	3/4"		Yes	Five inch flash on face of plate.
1448	US	88				union and		Unfair hit on
1\$52	U8	89	6" Below	1/2"	3/4"		No	top of can. Two inch flash on face of
	A TI							plate. Large flash smudge on can.
1500 1502 1	UK	90 91				All and the		Missed can. Missed can. Missed can.
90,	The state of		To new				5	
The fact	The same of the sa	The same of the sa	900-0-000 PERSON (000)	Charles and Commercial Street	COLUMN TO SERVICE STATE OF THE PARTY OF THE	100 100		145:



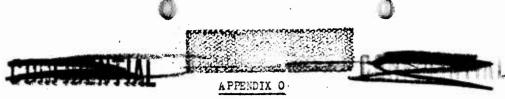




TILE	ALMUNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLF	EXIT	SITE OF FLASH INCRES	IGNITION	RETARKS
1504	UK .	- 93	8" Below	.280	1"		Yes	Four inch .
			. II.					flash on face of plate.
1507	US	94	-	I - I	-	-	-	Missed can.
1508	US	95	9" Below	1/2"	1"	-	No	Nissed can. One inch
1509	US	96	9 ветом	1/2	1		NO	flash on face of plate. Large smudge on can. Base of bullet jacket stuck in plate.
. 1515	UK	97	.3" Below	•280	.280		Yes	Five inch flash on face of plate.
		Dates	20 March 195	50				
			8" between W/Plate - Al					
091,5	US	1-9	•	-	-	- 9	-	Locators
0950 101 5	uk us	10 - 13 山	8" Above	1/2"	1/2"	• 11	No	Locators Three inch
1019	US	5 <u></u> .	O REGUE	1/2	2, 2		,	flash on face of plate. Small flash
								smudge on face of can. Base
				11,5				of jacket
1021	UK	15	ME TO THE		116			stuck in plate. Missed can.
1022	UK	16	4" Above	.280	1/2"		No	Four inch flash on face of plate. Very faint-flash
1026	US	17	7" Above	1/2"	1"		No ·	smudge on can. Two inch flash on face of plate Large smudge on can. No.
7			A	d d				pieces of jacket in plate.



TIME	APPUNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	EXIT	SIZE OF FLASH INCHES	IGNITION	RE ARKS
1030	UK	18	3" Above	.280	1/2"		No	Four inch flash on face of plate. Small smudge on can.
1034 1036	US US	19 20	evodA *8	1/2"	1"	•	no	Missed can. Four inch flash on face of plate. Large smudge on can. Base of jacket stuck in plate.
1038	UK	21	•	•	-	-	•	Missed can.
1040	UK	22	-	-	-	-	-	Missed can. Hissed can.
1042 1401	UK UK	23 24	_	-	-	-	-	Missed can.
1042	UK	25	l" Above	.280	.280	ī	No .	Four inch flash on face of plate. Very faint smudge on face of can.
1045	US	26	•	•	•	-	-	Missed can.
1046	US	27	-	•	-	-	-	Missed can.
1047	US	28	5" Above	•30	1"	-	No	Two inch flash on face of plate. Large
				. Tallelle				smudge on can.
1049	UK	29					_	Missed Cangen
1050	UK	30	7" Above	.280	.280		No	Four inch on face of plate. Very faint smudge on can.
1053	US	31	9" Above	1/2"			No	Two small exit holes. Two inch flash on face of plate.
				CENTY C			•	Small smudge
1056	***	10				APIL MAIS		on can.
1058	UK	32	O" Ahove	.280	1/20	A Barrier	No	Missed can.
	15200000	SE CO		COMPA				flash on face
			1411	+	ALL BEING			of plate. Faint
	<u> </u>		t					smudge on can.



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TIME	AND/UNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	EXIT	SIZE OF FLASH INCHES	IGNITION	RD'ARKS
			12" be W/Plat	tween plate : e - Below Fu	and can	<u>L</u>		
1105	US	34		_		_	_	Missed can.
1105 1108	US	35 35	-	-	-	-	-	Unfair hit on
								top of can.
1113	US	36	-	•	-	•	-	Unfair hit on top of can.
1116	· us ·	37	5" Below	1/2"	-	-	No	Core dented rear side of
								can but re-
								mained in can.
								Two inch flash
•								on face of plate. Small
								smudge on can.
1125	UK	38	-	-	-	_ =	-	Missed can.
1126	UK	39	-	-	-	` -	-	Missed can.
1127	UK	40	-		-	-	-	Missed can.
1132	UK	41		• .	-	-	-	Missed can.
1134	UK	145	h" Below	.280	.280	-	Yes	Two inch flash on face of
								plate.
1138	US	43	10" Below	1/2"	1/2"	_	Yes	Three inch
	•	4)	20 2020	and the second	14212			flash on face
	-							of plate.
				of -				Base of jacket
111.7	****	44	8" Below	1/2"	1/2"	-	Yes	stuck in plate.
1143	UK	44	O Delow	1/2	1/2		Ies	Four inch flash on face
	Value A							of plate.
1307	US	45	8" Below	3/4"			No	Core dented
1490				The Party				rear of can,
								but did not
								come through.
3						7.100		Two inch flash on face of
			5,					plate. Slight
-								flash smudge
1335					-101	at	• 3	on can.
1314	UK	46					E 3 1 1 1 1 1 1	Unfair hit.
1317	UK	47		The second second	and the same of th			Missed can.
1319	UK	48	365 1000 996		Contract of the Contract of th			Missed can.
		. 100					31.	· .
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TIME	AMMUNITION TYPE	RD.	STRIKE (RFF.TO FUEL LEVEL)	ENTRANCE HOLE	HOLE	SIZE OF FLASH INCHES	IGNITION	REVARKS
1320	UK	49	-L"-Below	1/2"	1"	-	No	Three inch
	,							flash on face of plate. No flash smudge on face of can.
1328	us 	50	3" Below	1/2"	-	•	No	One inch flash on face of plate. Very faint flash smudge. Core dented rear of can, but did not penetrate.
. 1336	UK .	51	5" Below	.280"	1/2"	-	Yes	Three inch flash on face of plate.
1343	US	52	Ц" Below	3/4"	3/4"		No	Two inch flash
								on plate. Slight flash smudge on can.
1350	UK	53 ·	5" Below	.280	.280	•	Yes	Five inch flash on face
								of plate.
								or praces
		-		ween plate : - Above Fu				
1355	us	54					. •	Unfair hit, below fuel.
1408	US	55	2" Above	1/2"	3/4"		No	Three inch
				· •				flash on face of plate. Slight smudge on can.
1411	UK	56	3" Above	1/2"	1/2"		No	Four inch flash on face of plate.
THE .								Faint flash
1413	US	57						smudge on can. Missed can.
1414	US							Missed can.
1415	US	58 59	L" Above	1/2"	8 5 10		No	Two 1/2" exit
								holes. Two inch
		g (c	art a spice	A VAGO CONSTRAINT	A. (2000)			flash on face of plate. Small
			and the second				·. 	smudge on can.
De la Company		1 1	12.3			Carrier 3		
	-3.4	A. Commission		-46-	THE STATE OF		· in · · ·	202
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Appendix 0

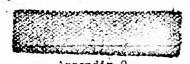
TIME	AMMUNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	EXIT	SIZE OF FLASH INCHES	JGNITION	PEMARKS
1416	UK	60	5" Above	.280	1/2"	-	No	Five inch flash on face of plate. Faint smudge on can.
1418	us	61	-	•	-	-	-	Unfair hit on side of can.
11:20 11:21	us us	62 63	5" Above	1/2"	-	-	ЙO	Missed can. Three inch flash on plate, very faint smudge on can. Two 1/2" exit holes
1424	UK	61	-	-	-	-	• 1	Unfair, hit, below fuel level.
1627	UK	65	-	-	_	-	-	Missed can.
1430	UK	66	-	-		_	-	Missed can.
1431	UK	- 67	•	• .	-	-	-	Missed can.
1432	UK	69	-	-	-	-	-	Missed can.
11,33	UK	69	6" above	1/2	1		No	Five inch flash on face of plate. Very faint smudge on can.
1436	u s	70	3 ⁿ Above	1/2"	3/4"		· No	Two inch flash on plate. Slight smudge on can.
1439	UK	71	•		-	-	•	Missed can.
1440 1441	UK UK	72 73	10" Above	.280	.280		No	Missed can. Three inch flash on plate. No flash smudge on can.
1145	US	74	1904 - T-1944	* X		170		Missed can.
. 1446	us	75	1/2" Above	1/2"	3/4"		No	Three inch flash on plate. Faint smudge on can.
1450	US .	76	L' Above	.280 -47-	.280		No No	Five inch flash on face of plate. No smudge on can.





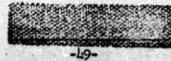


	TIME	APMUNITION TYPE	RD.	(RFF.TO FUEL LTVEL)	ENTRANCE HOLE	EXIT	SIZE OF FLASH INCHES	IGNITION	RETARKS
				W/O P	late - Above	Fuel L	evel		
	1510	US	77	3" Above	.30	1/2"	-	No	Six inch flash in rear of can. Small flash smudge around exit hole in rear
		,					payable.		of can.
			78	_	-	-	-	-	Missed can.
	1514	UK UK	79	_	-	-	-	-	Missed can.
	1515	UK	80	•	-	-	-	-	Missed can.
	1516	UK	81	-	-	-	-	-	Missed can.
	1517 1518	UK	82	-	-	-	-	-	Missed can.
٠	1519	UK	83	•	-	-	-	-	W/plate.
	1520	UK	84	-	-	•	-	•	Fired for
									locating.
					- Per 3		_	-	W/Plate
	1521	UK	85	-	-	_			Fired for
									locating.
	WL		86		1.52		•	-	W/Plate
	1522	UK	00		111				Fired for
•									locating.
	1525	UK	87	9" Ahove	.280	.280	-	No	Two inch flash visible
	1727	0							at rear of can-
		24						•	at lear of the
				Date: 21 M	arch 1950				
	• 1								Locators.
	1255	US	1-4	2012 SEC.		4			Locators.
	1300	UK	3-14 15	3" Above	.30	.30	None	No.	
	1306	us uk	16	, Abovo		4	1000		Missed can.
	1310 1311	UK	17						7 11 Alask
	1312	a UK	18	4" Above	.280	.280	-	Yes	Small flash visible at
	-)					şi.		47	rear of can.
					3.5		A CHARLES		Can ignited at
				and the second		40.043	- 1 P		exit hole.
	331.32			00	30	1/2"	MEAS: SI	No	Four inch
	1315	us ,	. 19	8" Above	• 30				flash at rear
	150		1	能是此分別的					of can. Small
	10	121			-	COURSE.		Ser andre	flash smudge
	100		The Real Property of		ACCULATION SOME	SEC. 3005	75	STATE OF	around exit
							-		hole in can.
					PROPERTY AND PROPERTY.	100 CO 100 CM	205		HILDS CO.



			PACE AC
			^
- A	ppen	ClX	U

-			STRIKE			SIZE OF		
	AMUNITION	RD.	(REF.TO	ENTRANCE	EXIT	FLASH		
TIVE	TYPE	NO.	FUEL LEVEL)	HOLE	HOLE	INCHES	IGNITION	REMARKS
1317	UK	20	. •	-	•	-	-	Missed can.
1319	UK	21	1/2" Above	.280	.280	-	No	
1321	US	55		-	-	-	-	Missed can.
1322	us	23	7 [™] Abo ve	.30	.30	-	Yes	Three inch flash at rear of can. Can ignited at exit hole.
1327	· UK ·	24	_		_	_	-	Wissed can.
1330	UK	25	_	-	-	-	-	Missed can.
1334	nk ev	26'	-	-	-	-	_	Missed
1335	UK	27	-	-	-	_	-	Unfair hit.
1337	UK	28	•	_	_	- 2	_	Missed can.
1340	UK	29	6" Above	.280	.280	None	Vo.	
1342	US	30	9" Above	.30	.30	-	No	Long streak of flash from
								rear of can.
1345	UK	31	•	-	-	-		Missed car.
1346	UK	32	9" Above	.280	.280	-	Yes	Can ignited at exit hole,
						·		but burned only about 5
								secs. Two inch
			W/O Die	te - Below I	Pural Tra			at exit hole.
	24		11/0 FI	ce - Datow	ruel De	<u> </u>		
1350	US	33	10000		1-04			Unfair hit.
1355	US	33 34	6" Below	•30	1/2"		Yes	Three inch
ALC: N		-			A.V.			flash at rear
								of can. Can
170								igniesd at
GR.								exit hole.
1700	UK	35 36	A STATE OF THE PARTY OF THE PAR	73.7		100		Missoi cupa
1705	UK	36	5" Below	.280	.280	None	No	No visible
	LESS STREET		and the same					indication of
			3620000000	G9502082580538	2032388			functioning.











Appendix 0

		CODITE					
AMMUNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLF	HOLE	SIZE OF FLASH INCHES	- ICHITION	RE ARES
US	37	-		_	-	-	Missed can.
	38	•	-	-	-	-	"issed can.
	30	-	-	-	-	-	Missed can.
	ĹÓ	_	_	-	-	-	Unfair hit.
	Li	-	-	-	-	-	Missed car.
		•	1 - 1	<u>-</u>	-	-	l'issed can.
US	43	5" Above	.30	•30	-	. No	Small streak of flash 3 feet in rear of can.
UK	44	-	-	-	-	-	Missed can.
	1,5	-	-	-	-	•	Lissed can.
· UK	46	X .	-	-	-	-	Missed can.
UK	47	-	-	-	-	-	Missed can.
UK	48	•	-	-	-	-	Missed can.
UK		=:	-	-	-	-	Missed can.
UK	50	-	-	-	•	-	Missed can.
UK	51	-	•	-	-	-	Missed can.
UK	52	-	• •	•	-	-	Missed can.
UK	53	-	-	ث	•	-	Missed can.
UK	54	•	-	-	-	-	Missed can.
UK	55	-	-	-	-	-	Missed can,
UK	56	10" below	.30	1/2"	-	No	Four inch
			100	•			flash visible
							at rear of can. Faint smudge around exit hole in can.
TIS .	57	5" Below	.30	1/2"	None	· No	No visible
-	7,						indication of
							functioning.
19K	58			8.	-	-	Missed can.
	59			-	-	-	Missed can.
					A155A	_	Missed can.
		0.25		-	-	-	Unfair hit.
		*	Park India	-	- 000	-	Missed can.
	63		9 4 .	•			Missed can.
UK	6L	AVIII TO A TO THE STATE OF		•			Missed can.
UK	65			•.		5 S -	Unfair hit.
UK	66			•	- ,		Missed can.
UK ,	67		-11		III THE A SE		Missed can,
UK	68	5" Below	.280	.30,	None .	No /	
US.	69		* *		Control of the second	CONTROL OF	Missed can.
	US U	US 37 US 38 US 39 US 40 US 41 US 42 US 43 UK 44 UK 45 UK 46 UK 55 UK 55 UK 55 UK 55 UK 55 UK 55 UK 56	US 37 - US 38 - US 39 - US 40 - US 41 - US 42 - US 43 5" Above UK 44 - UK 46 - UK 49 - UK 50 - UK 51 - UK 52 - UK 55 - UK 55 - UK 55 - UK 55 - UK 56 10" below UK 67 - UK 66 - UK 66 - UK 67 - UK 66 - UK 67 - UK 68 5" Below	US 37	TYPE NO. FUEL LEVEL) HOLF HOLE US 37	TYPE NO. FUEL LEVEL) HOLF HOLE INCIPES US 37	TYPE NO. FUEL LEVEL) HOLF HOLE INCIPES LIGHTION US 37 US 38

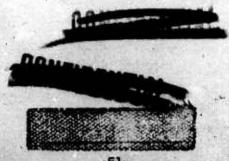






Appendix O

TILE	ADMUNITION TYPE	RD.	STRIKE (REF.TO FUEL LEVEL)	ENTRANCE HOLE	EXIT HOLE	SIZE OF FLASH INCUES	IGNITION	REMARKS
1521	US	70	5" Below	.30	1/2"	- .	No	Four inch flash 3 feet in rear of can.
1527	UK	71	-	-	-	-	-	Missed can.
1528	UK	72	9" Below	.30	1/2"	None	No	
1532	US	73	Ц" Below	.30	1/2" 1/2"	-	No	Six inch flash one foot in rear of can
1537	UK	74	•	-	-	* mh(%) / #8		Unfair hit.
1540	UK	74 75	-	-	-	-	-	Missed can.
1542	. чк	76	5" Below	.280	1/2"	-	Ю	Five inch flash at rear of can. Small flash smudge around exit hole in can.



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